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SALES QUOTA DETERMINATION

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BUSINESS executives have employed many imperfect, even crude, methods of setting quotas or goals for salesmen. They have not clearly perceived that quota determination is an important focal point for the many aspects of sales planning. This is not surprising, since the problems met and solved in one industry do not always challenge as much attention elsewhere. For one firm, the questions when and where to sell its different products to best advantage are receiving careful study. Another is experimenting to find the right price at which to sell. Still others are much concerned with whom, what, or how to sell. All of these phases of planning must find some degree of expression and crystallization in a desirable system of setting quotas or goals to be attained by a sales organization within stated periods of time.

The displacement of opportunism in management by systematic planning was facilitated by the growth of larger enterprises. Single events, particular orders, and other phenomena, of so much interest to small concerns as they proceed from day to day, become merged in the large firm's seasonal variations, trends, classifications of wholesale and retail outlets, and analyses of the con-

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sumption of different areas and various types of consumers. Its operations in larger portions of the market for particular products thus becomes a fertile field for economic and statistical generalizations in which single phenomena are regarded as belonging to groups of similar phenomena and differing only in degree from many others of their kind. The normality of an event in business determines the likelihood of its recurrence or of a similar circumstance being in existence at present. The more abnormal it is the less chance there is of its recurrence and hence the greater the risk involved in basing business decisions upon it. Conversely, the more normal it is, the more frequent its recurrence and the more dependable the business plans adjusted to it. Helping to discover the normal situation, the normal tendency, and the reasons for variation from normal, is the function performed by statistical methods in the planning of business operations and the setting of sales quotas based on such plans.

The intelligent setting of sales quotas for a stated period of time presupposes some knowledge of the sales possibilities or potentials for a whole distributive organization and for respective areas, and whether the selling performance in each area is good or mediocre, relative to its possibilities. Knowledge of the possibilities depends on observation and analysis, much of which is likely to be of a statistical nature. Performance may be judged in relation to the possibilities, or an attempt may be made to evaluate the so-called human or personal elements in selling, possessed by each salesman. The latter method is easier to apply to factory workers than to salesmen, because dexterity in physical operations may be measured according to time required and other respects. One salesman may replace another on the same route and spend as much time in making as many calls, but the results may be radically different. A salesman's personal characteristics may be very effective in selling goods to independent dealers but not to chain-store buyers. Different conditions require different types of selling effort. Measurement of the possibilities, therefore, is necessary before judging performance. After that, the setting of quotas which a salesman may regard as "reasonable" and may strive to accomplish in a year or less, requires consideration of the

possibilities of his territory, his relative performance, his personal characteristics, and many other pertinent factors. Lack of knowledge of the proper methods of measuring the possibilities and performance, as well as of the scope of the problem, has brought about the development of different practices in quota-setting, which deserve discussion.

As small firms extend over wider areas or portions of a market, the desire for further growth through improved selling effort finds expression in the first simple but crude method of setting quotas—a uniform percentage increase[2] from year to year for all sales areas. This method requires the making of two assumptions, not in accordance with experience. The first is that year after year the firm may increase its sales volume, say 10 per cent. Little or no consideration is given to the slower growth of population, the expansion or contraction of its particular market, the rise or decline of its competitors, the phases of the business cycle, and other factors. Such quotas are merely the result of wishful thinking.

The second assumption is that the possibility of bringing about the desired quarterly or annual increase is the same, or equal, in every salesman's area. It would be sound only if last year's performance in every area bears the same ratio to regional possibilities or potentials. Such a situation would be unreal. There will be opportunity, later, to see that varying conditions from area to area modify the possibilities. High or low performance in relation to possibilities determines, to some extent, whether a percentage increase may be easy or difficult to accomplish. Thus, salesmen Smith and Jones may each have sold 100,000 units of product and are asked to increase their sales 10 per cent to 110,000 units apiece. If Smith's potential market is 500,000 units while Jones's is only 300,000, Smith may find it easier to make a 10 per cent increase than Jones. His performance has been 20 per cent of his opportunity, while Jones's has been $33\frac{1}{3}$ per cent. Smith should sell 835,000 units, representing an 18.4 per cent increase, in order to make his accomplishment proportionate to Jones's. Such a goal might be impossible for Smith to attain within the time allotted,

[2] L. D. H. Weld, "Measuring Sales Potentials. I. Their Value in Selling and Advertising," *Printers' Ink*, July 31, 1930, p. 26.

but at least he should be required to increase his sales relatively more until sometime in the future his relative performance equals that of Jones.

The inadequacy of the assumptions and methods just outlined brought about attempts to find ways of setting quotas which would be more pragmatic, more in keeping with the facts encountered in business. It was shown clearly, even though incompletely, that quotas must be set from time to time as well as from place to place in accordance with the varying conditions of time and place.[3] Thus, a distinction was drawn between two broad phases of the program for marketing a product, namely, time and place distribution. The projection of a plan for the future involves the element of time. From the broad standpoint of marketing, time distribution includes all the problems of efficient distribution of the particular product or service over periods of time, in order that consumers may always have an available supply. Place distribution includes the proper geographic distribution of the particular supply at any given time.[4] These are, of course, interdependent. On the one hand, the amounts distributed geographically make up the total marketed in a given period. On the other hand, this total is governed by secular changes, not only of a general nature but also of a nature peculiar to different areas. The time elements in a sales program are very important and should be given full consideration in setting realistic quotas.

As the need for better objective standards of regional sales performance was recognized, quotas calculated by arbitrary percentage increases of past performance were superseded by those set according to the variations in either the total sales of an industry, the sales of non-competing products, or one characteristic of the respective areas. In a few industries, notably automobiles, tires, radios, and insurance, total sales have been compiled by either a trade association or a governmental agency. The individual manufacturer sets up his regional objectives as a certain proportion of

[3] J. H. Barber, "Budget Sales Quotas," *Harvard Business Review*, III, No. 2 (January, 1925), 210–20.

[4] D. R. G. Cowan, "The Commercial Application of Forecasting Methods," *Journal of Farm Economics*, XII, No. 1 (January, 1930), 151–52.

the total sales or consumption. For parts of automobiles or radios, and generally for products having their demand derived from the use of other products, essentially the same practice was followed. Thus a tire manufacturer, basing his quotas directly on the number of automobiles registered, adopted the slogan, "Every fourth wheel," superseded later by "Every third wheel." Though not perfect, this solution of the problem was very practical and easy to understand.

In other cases, the number of income tax returns, residence telephones, native white population, or retail outlets became the basis for quotas. These data are obtainable by counties and cities from such sources as the United States and Canadian Censuses and the special publications of various advertising and mercantile concerns. They may be adapted to sales areas not conforming to county and state boundaries. Thus it might be assumed that a certain proportion of those persons having at least sufficient income to require the making of income reports would be prospective buyers of a new product. Obviously colored people provide the market for white rouge. For some universally used products like table salt, total population was just as serviceable, and perhaps more dependable, than some of the indexes mentioned.

Some publishing companies went so far as to suggest the use of their own magazine sales as satisfactory market-indexes, claiming that their circulation almost completely covered or reflected the potential market.[5] However, the impossibility of choosing a single adequate market-index for many products was soon realized. Because sales are the result of a multiplicity of influences, several factors should logically be used.[6] A higher proportion of low-priced automobiles could be sold in low-income areas. Wealthy colored people in less segregated communities may use larger quantities of white rouge. The assumption that a single index would measure the market was broadened to include several indexes. These indexes were chosen largely by a priori reasoning.

The problem then arose of combining the different series into

[5] Crowell Publishing Co., *National Market and National Advertising, 1923*, p. 31; *The National Market and Crowell Circulations, 1933*, p. 10.

[6] Barber, *op. cit.*, p. 218.

one index upon which regional market estimates could be based. Obviously such heterogeneous units as telephones, wired homes, retail outlets, radios, native white population, value added by manufacturing, income, and many others could not be compared with each other or with a product's sales when expressed in dollars, pounds, or other units. Moreover, they could not be added together. Thinking to avoid these difficulties, a group of non-competing manufacturers added together their sales in dollars and the resulting general index served each one as a guide in setting quotas. An important difficulty in combining the sales of different companies is that their selling areas, when economically laid out, do not conform to political subdivisions and differ much in their size and boundary lines. Moreover, this index was worse than useless as a measure of the market for any given product. It reflected the conditions influencing the sales of other products, and not pertinent to the product in question. Even this it did not do satisfactorily, because the sales of other products were certain to be spotty and not related perfectly to all the market conditions influencing them. Furthermore, the tendencies in the regional sales of one product might counterbalance opposing tendencies in the regional sales of another.

At length a method of combining several market factors was adopted. It may have had its origin in a common viewpoint of central management that regional quota-setting consists of dividing a total sales objective into subquotas proportionate to selected measures of sales possibilities. By expressing a factor's numerical value for each area as a percentage of the total or average for the state, or for the United States, it could be compared with a company's sales when similarly expressed. This form of expression was adopted by non-competing manufacturers for their combined sales index and by publishing companies[7] in issuing and promoting the use of their magazine circulation and other series as market indexes. Nothing could be easier than to select certain factors and combine them by averaging their regional percentages. If one series was assumed to be of more importance than another, it

[7] Curtis Publishing Company, *Sales Quotas* (1925), p. 21, and *Markets and Quotas* (1932), p. 35.

could be given more weight. The regional percentages were then made to add up to 100 and could be used to divide the total sales objective into regional quotas.

In general, the relationships between the sales of a product and these indexes are assumed but not proven, may not be causal, and may not always affect sales in the direction assumed. Moreover, it may be shown that the sales possibilities of a low-quality or high-quality product may not vary from area to area in accordance with the total sales of similar products of the same industry. In the past, for instance, the regional variation in Ford sales was different than that of many other automobiles. It became apparent that each manufacturer must choose and combine factors into an index seemingly best fitted to parallel his own sales. Such an index was prepared for automobiles[8] by "cut-and-fit" approximations. Factors, by states, were expressed as percentages of total, and weights were assigned to each after a series of over 3,000 experiments. The chosen formula was then applied using county data expressed as percentages of their state totals.

It was an excellent idea to test the applicability of factors, rather than to allow their assumed value to stand unchallenged. The method brought futile results because the element of population, common in the various state and county indexes when expressed as percentages of total, made them high or low where, for the same reason, sales were large or small. The underlying relationships were obscured and the choice of factors made very difficult. An illustration[9] from data supplied by an early exponent[10] of the method is given in Table I.

The difference between the average of the percentages for Pennsylvania and Ohio is 3.3 per cent and is to be explained main-

[8] H. G. Weaver, *Territorial Market Analysis*, "American Management Association Sales Executive Series," No. 34 (1926), pp. 3–8; "The Development of a Basic Purchasing Power Index, by Counties," *Harvard Business Review*, April, 1926, pp. 275–89.

[9] This illustration is taken from D. R. G. Cowan, "Analyzing the Market for Poultry Products," *Proceedings of American Institute of Cooperation* (3d summer ser.), pp. 679–712.

[10] Crowell Publishing Company, *National Markets and National Advertising, 1923*.

ly by the difference of 2.7 per cent in their population. No wonder that in twelve states selected at random from different sections of the country a publisher's circulation of magazines showed very high correlations (0.9473 to 0.9988) with a consumption index.[11] A secondary difficulty in judging selling performance by such a

TABLE I

COMPARATIVE MARKET POSSIBILITIES OF TWO STATES AS INDICATED BY VARIOUS SERIES WHEN EXPRESSED AS PERCENTAGES OF THE UNITED STATES TOTALS

	Population	Percentage Tax Returns	Personal Income	Total Value Mfg. Products	Autos Other than Fords	Retail Outlets	Average
Pa.	8.2	9.3	9.6	10.5	7.2	10.5	9.2
Ohio	5.5	5.6	5.2	6.6	7.1	5.4	5.9
Difference	2.7	3.7	4.4	3.9	0.1	5.1	3.3

TABLE II

COMPARATIVE MARKET POSSIBILITIES OF TWO STATES AS INDICATED BY VARIOUS SERIES WHEN EXPRESSED ON A PER CAPITA BASIS

	Tax Returns	Personal Income	Total Value Mfg. Products	Cars Other than Fords	Retail Outlets
Pa.	0.07	0.26	0.74	0.05	0.016
Ohio	0.06	0.21	0.71	0.07	0.013

measure is that an absolute increase in the sales of one area may cause decreases in the relative proportions sold in other areas unless the latter accomplish relatively as large increases.

These difficulties gave rise to the desirable practice of eliminating the population element by reducing each series to a per capita basis. Using Pennsylvania and Ohio as illustrations again, their per capita series are as shown in Table II.

[11] Crowell Publishing Co., *The National Market and Crowell Publications, 1933*, pp. 11–12.

This step is analogous to the one carried out as a preliminary to many analyses of commodity prices, namely, the deflation of the price series by dividing it by an index of the general level of prices. Sales and other factors should be deflated by the population applicable in each case—consumer goods by human beings, dog food by dog population, gasoline by gasoline engines or automotive vehicles, and so forth. When the per capita sales of a product, such as butter, are compared with per capita income tax returns, per capita magazine sales, per capita retail outlets, and other per capita data, the relationships between sales and these market indicators are often less obvious, entirely absent, or in opposite direction.

The difficulty of readily detecting relationships by simple comparison of series of per capita sales and per capita market indexes, turned attention instead to regional comparisons of per capita sales performance. Such comparisons are advantageous, especially for consumer goods, because allowance has been made for the variation in total sales due to variation in total population. It was easy to conclude that areas below average in per capita sales possess relatively greater possibilities for increasing them, and to set quotas on that basis.[12] This method was a real improvement over those previously described, but it soon encountered difficulties. Variation in per capita sales is usually so wide that quotas for most areas, when set on a level with the highest per capita performance, are quite unattainable within reasonable periods of time, and, therefore, fail to induce salesmen to expend greater effort. Sweeping adjustments for past performance are necessary in order to make the quotas attainable, and therefore practical as incentives. Moreover, the assumption that one element, population, is the sole market-determinant is too limited. The method fails to allow for tendencies in the per capita sales arising from the influences of varying conditions, such as population density, types of people, competition, and the like.

Measurement of the tendencies to be found in per capita sales was soon undertaken by correlation.[13] This scientific procedure

[12] Perhaps the first to use this method was the author.

[13] The first person to apply statistical methods to this problem in an extensive

took the place of the laborious and futile testing of percentage-of-total series. It was introduced because sales managers drew conclusions that per capita sales were high in some areas and low in others on account of the presence or absence of certain conditions. For example, it was known that dry (summer) sausage was consumed mainly by certain European elements in the population, such as Italians, Germans, Scandinavians, and many others.[14] In their native lands, the lack of refrigerating facilities caused them to develop less perishable types of sausage by smoking, cooking, and spicing. Their preference for dry sausage was retained after coming to the United States, and manifests itself in the higher per capita sales wherever they live. To evaluate their influence, one company followed the simple procedure of ranking the cities of 100,000 or more according to the percentage of these people living in each city, as derived from the United States Census.[15] In eighty-four cities these percentages vary from 0.9 to 47.8, while in 1933 the corresponding sales of dry sausage ranged from 0.3 units to 87.1 units per person. From Table III it may be observed that dry sausage sales tend to be higher where relatively more of the special consumers live.

By calculating the average per capita sales of each group of areas having percentages of these consumers ranging, say from 0 to 10 per cent, 10 to 20 per cent, 20 to 30 per cent, 30 to 40 per cent, and 40 to 50 per cent, the sales manager may judge the comparative sales possibilities of the different groups of areas and determine quotas accordingly. In accordance with the sales tendency shown by the group averages of our example, the per capita

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manner probably was the present author, who undertook this work in 1925 under the general direction of Dr. L. D. H. Weld.

D. R. G. Cowan, *Some Difficulties To Be Encountered in Determining Sales Quotas*, "American Management Association, Sales Executive Series," No. 31 (1926), pp. 2–12.

D. R. G. Cowan, "Analyzing the Market for Poultry Products," *Proceedings of American Institute of Co-operation* (3rd summer ser.), pp. 679–712.

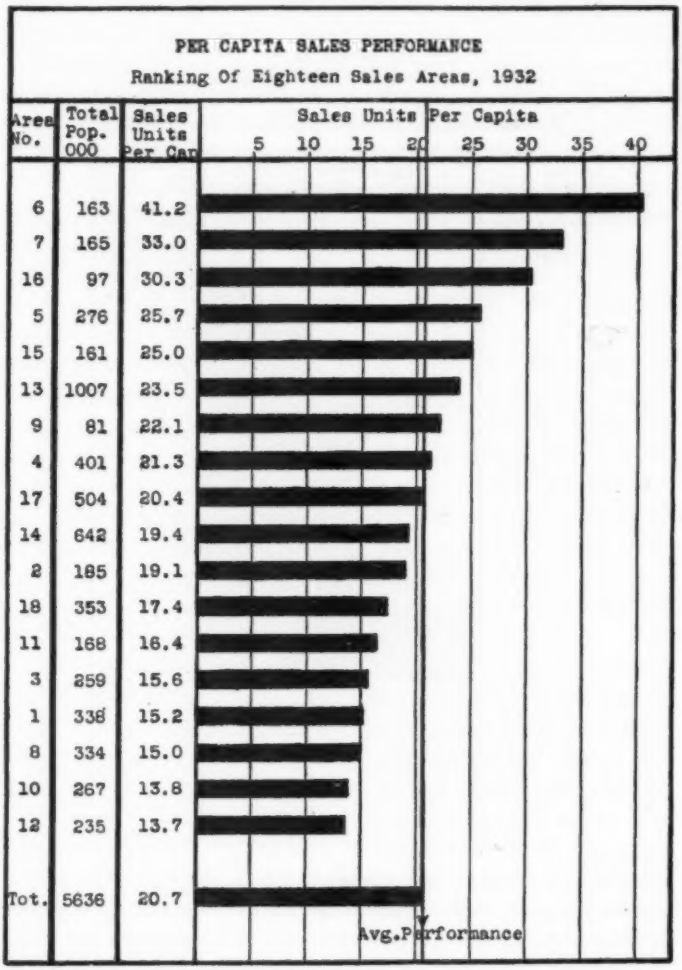
L. D. H. Weld, "Scientific Determination of Sales Quotas," *Printer's Ink*, May 30, 1929.

[14] *Swift & Company Yearbook, 1930*, p. 37.

[15] *United States Census, 1920*, II, 926, Table 9.

quotas for the fifth group should average more than five times the first group, more than twice the second, and somewhat higher

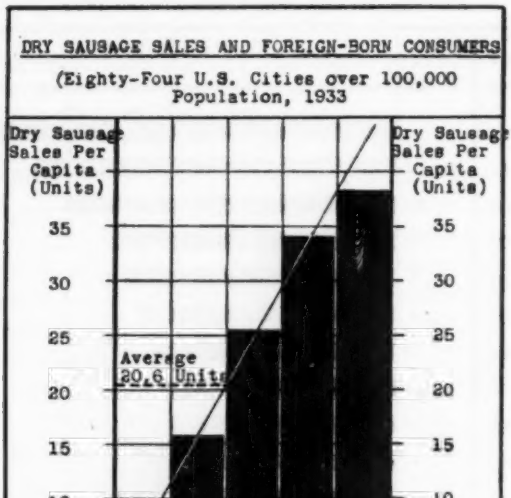
CHART I



than the third and fourth. Second, the sales manager may use the average per capita sales of each group as the standard of per-

formance for the group members. In our example sixteen cities in the 0–10 per cent group were below the group's average. The sales manager may rank all cities, first, second, third, and so on, according to the degree in which their performance compares with

CHART II



the group averages, thus enabling him to set quotas requiring reasonably greater increases in the areas of relatively low performance and to take other remedial action. Having determined the per capita quotas, they are multiplied by the corresponding population. The resulting preliminary quotas are proportionately

adjusted so that their total may equal the predetermined goal of the entire sales organization.

This procedure is not exact enough because a tendency exists for per capita sales to be lower than average in the first half of each group of cities and to be higher in the second half. In the 0–10 per cent foreign-born group, fourteen cities contain 0–5 per cent foreign-born and their sales average 3.7 units per capita, while sixteen cities contain 5–10 per cent and their sales average 10.4 units. Narrower groups would likely be more erratic when the number in each group is small. Thus in the 20–30 per cent group, the average sales per capita of eight cities with 20–25 per cent foreign-born is 26.4 units, which is higher than the average of 25.5 units for the entire group because the sales force in the city of 20.03 per cent foreign-born sold 44.2 units per capita. To meet this difficulty, the statistician "smooths" the tendency by charting a line to conform to the groups' averages. This procedure, as illustrated, enables more accurate setting of a performance standard for each city or sales area. Thus the sales of 0.3 units per capita in the city of lowest proportion of foreign-born (0.9 per cent) is compared with a standard of 2.6 units obtained from the smoothing line, instead of the group average, 7.3 units. Similarly the per capita sales of 10.1 units in the city of the first group having the highest proportion of foreign-born (9.8 per cent) appears as a less favorable performance when compared with a standard of 11.5 units instead of the group average.

The smoothing line enables the sales manager to redistribute the per capita sales according to the importance of foreign-born in each city. Also, he may estimate the possibilities in new sales areas if the percentages of foreign-born are available. Since the line conforms to the averages of the groups, about half the cities will show performances above 100 per cent of the estimates. If it be assumed that the estimates, or redistributed per capita sales, parallel total consumption, it has a better psychological effect on salesmen to raise them to the consumption level, about 8.5 times higher in these cities (col. 5). Also it is advantageous to express performance as a percentage of estimated total consumption (col. 6).

Instead of a straight or curved line, the statistician may use correlation technique, whereby a mathematical measurement may

TABLE III

PERFORMANCE RANKINGS OBTAINED BY DIFFERENT METHODS IN 84 CITIES, 1933

Per Capita, Group-Average, Redistributed Sales, and Estimated Consumption

(Only thirty cities having 0–10 per cent foreign-born shown)

Cities Ranked by Percentage of Foreign-Born (below 10 Per Cent)	Dry Sausage Sales per Capita (Units)	Comparison with Highest per Capita Ranking	Comparison with Group Average (7.3) as Standard			Comparison with Redistributed Sales as Standard				Comparison with Estimated Consumption		
			Difference (Units)	Percentage Performance	Ranking	Standard	Difference (Units)	Percentage Performance	Ranking	8.5 Times Standard	Percentage Performance	Ranking
(1)	(2)	(3)	(4a)	(4b)	(4c)	(5a)	(5b)	(5c)	(5d)	(6a)	(6b)	(6c)
0.9	0.3	84	− 7.0	4	84	3.7	− 3.4	8	84	3.1	10	84
1.3	0.6	83	− 6.7	8	83	4.1	− 3.5	15	82	3.5	17	82
1.5	1.4	80	− 5.9	20	80	4.3	− 2.9	33	76	3.7	38	77
1.7	0.8	81	− 6.5	11	81	4.4	− 3.6	18	81	3.7	22	81
2.4	1.6	79	− 5.7	22	79	5.0	− 3.4	32	77	4.2	38	76
2.5	3.5	73	− 3.8	48	68	5.1	− 1.6	69	58	4.3	81	58
2.5	2.1	76	− 5.2	29	75	5.1	− 3.0	41	70	4.3	49	70
2.7	9.0	64	+ 1.7	123	24	5.3	+ 3.7	170	7	4.5	200	7
3.0	0.7	82	− 6.6	10	82	5.5	− 4.8	13	83	4.7	15	83
3.1	9.5	57	+ 2.2	130	20	5.6	+ 3.9	170	8	4.8	198	8
3.2	1.9	78	− 5.4	26	77	5.7	− 3.8	33	75	4.8	40	75
3.6	2.4	75	− 4.9	33	72	6.1	− 3.7	39	72	5.2	46	72
3.9	7.0	67	− 0.3	96	38	6.3	+ 0.7	111	29	5.4	130	29
4.7	11.3	48	+ 4.0	155	11	7.0	+ 4.3	161	10	6.0	188	10
5.6	2.4	76	− 4.9	33	73	7.7	− 5.3	31	78	6.5	37	78
6.0	11.6	47	+ 4.3	159	10	8.1	+ 3.5	143	16	6.9	168	16
6.4	2.1	77	− 5.2	29	76	8.4	− 6.3	25	80	7.1	30	80
6.5	12.5	43	+ 5.2	171	7	8.5	+ 4.0	147	13	7.2	174	13
6.7	10.9	49	+ 3.6	149	12	8.7	+ 2.2	125	21	7.4	147	21
7.4	31.2	16	+23.9	427	1	9.3	+21.9	336	2	7.9	395	2
7.6	4.2	71	− 3.1	58	65	9.4	− 5.2	45	68	8.0	52	68
7.6	4.8	69	− 2.5	66	56	9.5	− 4.7	50	66	8.1	59	66
7.7	18.7	32	+11.4	256	3	9.5	+ 9.2	197	5	8.1	231	5
7.8	4.0	72	− 3.3	55	66	9.6	− 5.6	42	69	8.2	49	69
8.8	10.9	50	+ 3.6	149	12	10.4	+ 0.5	105	33	8.8	124	33
9.1	10.8	51	+ 3.5	148	14	10.7	+ 0.1	101	36	9.1	119	36
9.2	8.9	65	+ 1.6	122	25	10.8	− 1.9	82	45	9.2	103	42
9.2	15.8	39	+ 8.5	216	4	10.8	+ 5.0	146	14	9.2	172	14
9.6	7.4	66	+ 0.1	101	36	11.2	− 3.8	66	59	9.5	78	59
9.8	10.1	53	+ 2.8	138	15	11.3	− 1.2	89	40	9.6	105	40

be made of the general upward (or downward) sales tendency associated with successive increases in the importance of a market factor, in this case, foreign-born. In 1929 the coefficient of correlation (r) between foreign-born and the sales of dry sausage was +0.77 out of a possible +1.00.[16] The meaning is that, after

[16] To obtain this measurement statisticians will be interested to know that both percentage of foreign-born and per capita sales were first expressed in logarithms because both were found to vary geometrically.

expressing the variability of the two series in comparable units, one unit more of foreign-born in one area as compared with another will usually indicate that its per capita sales will be 0.77 of a unit higher. (If sales tend to decrease in the same degree with increases in percentage of foreign-born, the coefficient becomes −0.77 out of a possible −1.00.) The practical effect in this case is that one area may be expected to have nearly double the per capita sales of another area if its percentage of foreign-born is double. Another descriptive device, sometimes used, is the coefficient of determination which is the square of the coefficient of correlation. In this case, it is $(0.77)^2$ or 0.59, and indicates that regional variation in the relative importance of foreign-born explains 59 per cent of the variability of this product's sales per capita. Comparable measures may be used when the sales tendencies are curvilinear.

The sales of most products are influenced by more than one regional factor and their effect must be considered in setting quotas and measuring selling performance for the different areas. In our example, other unmeasured influences besides selling effort are reflected in the differences between actual and redistributed (standard) per capita sales (col. 5*b*) or the percentages of accomplishment (cols. 5*c* and 6*b*). These unknown factors account for 41 per cent of the total sales variability. If size of city is supposed to exert an influence, the differences (col. 5*b*)may be grouped and averaged for cities of varying size in order to measure the additional or independent influence of this market factor. If high income tends to increase (or reduce) sales, the differences between actual and redistributed sales will average higher (or lower) for the areas of higher income. The percentages of accomplishment (cols. 5*c* and 6*b*) will reflect such influences and will not indicate true performance until corrected.

By actual test, it was not found that these and other additional factors exerted a discernible influence upon regional sales of this product and the conclusion was that variation in the amount and quality of selling effort accounted for 41 per cent of the variation in per capita sales. Accordingly, space will not be taken to illustrate the procedure in determining new estimates of consumption

and accomplishment based on more than one variable market condition.

When two or more factors are of supposed importance in determining regional sales possibilities, the process of testing and measuring their effect by re-grouping and averaging the performance of sales areas, becomes complicated and subject to accumulating errors. The trained statistician prefers to use the more technical methods of multiple correlation. By so doing he reduces the labor involved in testing, measures more exactly the importance of different influences (especially those of a minor nature), estimates the sales possibilities of the respective areas based on the best combination of these influences, and judges accordingly the performance of each regional salesman or sales force.

By this method, the sales manager for a garden fertilizer learned that the combination of five variable conditions was associated with the varying per capita sales of the product in twenty large cities to the extent of 0.86 out of a possible 1.00. When three of the conditions were unimportant or absent in a city, per capita sales tended to be low. Where these factors were very important, sales tended to be high. On the other hand, where the other two factors were important, sales tended to be low. Although one factor was of doubtful influence, all of them together explained 74 per cent of the sales variability. After a similar study of the per capita sales in forty-eight states the sales manager ranked the states according to their per capita sales, comparative possibilities or potentials, and percentages of the potentials actually accomplished. He found that the state area standing first in per capita sales ranked tenth in possibilities and fifth in relative performance; that the area ranking first in possibilities was eleventh in per capita sales and thirty-seventh in performance; and that the area leading in performance led because it was seventh in per capita sales, although only twenty-sixth in possibilities.

Although comparisons of this nature are of fundamental importance, they must be supplemented in various ways before rational sales quotas may be established. First of all, the redistributed per capita sales or the potentials should be reviewed by a committee intimately acquainted with the practical administra-

TABLE IV

COMPARATIVE PERFORMANCE RANKINGS

(Sales per 1,000 People and Sales Redistributed by Multiple Market Factors)

States Ranked According to Sales per 1,000 People	Garden Fertilizer Sales per 1,000 People	Sales Redistributed by Market Factors	Percentage Actual Sales of Redistributed Sales	Performance Ranking
1	36.8	19.5	188.7	5
2	32.4	23.9	135.6	14
3	28.8	13.2	218.2	3
4	26.0	17.9	145.2	10
5	25.6	17.8	143.8	11
6	25.3	19.9	127.1	15
7	23.4	10.2	229.4	1
8	23.3	20.0	116.5	18
9	22.6	20.4	110.8	19
10	22.0	21.4	102.8	25
11	20.5	26.2	78.2	37
12	19.6	16.1	121.7	16
13	17.8	21.5	82.8	34
14	17.7	22.4	79.0	35
15	16.2	7.3	221.9	2
16	15.5	16.7	92.8	27
17	15.1	15.1	0.0	26
18	14.7	14.0	105.0	21
19	14.3	23.8	60.0	43
20	14.2	16.4	86.6	29
21	14.1	19.1	73.8	38
22	13.8	16.0	86.2	30
23	13.7	16.5	83.6	33
24	13.6	7.1	191.5	4
25	13.3	14.7	90.5	28
26	12.1	14.3	84.6	31
27	11.9	8.3	143.4	12
28	10.5	7.0	150.0	9
29	10.3	9.9	104.0	24
30	10.3	5.7	180.7	6
31	10.2	16.3	62.6	42
32	10.1	5.8	175.9	7
33	8.8	6.4	137.5	13
34	8.0	7.6	105.3	20
35	7.3	7.0	104.3	23
36	7.3	7.0	104.3	22
37	6.4	4.2	152.4	8
38	6.2	5.3	117.0	17
39	5.9	12.5	47.2	46
40	5.6	8.2	68.2	40
41	5.5	7.3	75.3	36
42	5.4	8.3	65.0	41
43	5.1	7.2	70.8	39
44	4.7	5.6	83.9	32
45	3.0	5.1	58.8	44
46	2.5	7.2	34.7	48
47	2.4	6.9	34.8	47
48	2.2	4.4	50.0	45

tion of selling in the different areas, so that good judgment may be supplied in adjusting for immeasurable qualitative conditions affecting performance. For example, there may be a contract with a chain-store organization which may raise the reasonable sales expectations of an area. The committee may also decide how much to ask each area below normal in performance to make up in addition to any increase required from both good and poor areas alike. The selected per capita objectives may then be multiplied by the corresponding totals of population and adjusted upward or downward so that in total they may conform to the expected secular changes in the business as a whole.

Circumstances may arise in which the regional tendencies found in per capita sales may not be the best basis for quotas. For example, the quality and price of an article may be raised or lowered with resulting changes in its use by different classes of consumers. It may seem desirable to correct a past tendency, in which case the sales analyst may reduce or omit its effect when estimating potentials. A new product obviously has no past distributive tendencies on which to base quotas, and the selection of its market indexes must rest, to a larger extent, upon deductive reasoning. In this case, it will usually be helpful to study the available market, the distribution of similar products, the experience of competitors, and the like.

This rational method of quota-setting is really a combination of the deductive and inductive methods of analysis. Sales may be examined to determine whether the many preconceived notions of business executives regarding the market really exist. In the process, unknown sales tendencies may be uncovered. Some criticisms of this method have already been advanced[17] and others may become apparent in subsequent discussion. Its important advantages may be summarized briefly as follows:

a) In measuring sales possibilities or potentials, and thereby setting standards of performance, it makes use not of past sales but of the factors likely to affect per capita sales in the future, some or all of which may have affected sales in the past.

[17] W. J. Reilly, *Sales Quota Procedure* (Erickson Co.), p. 13.
W. J. Reilly, *Handbook of Business Administration*, ed. W. J. Donald (American Management Association), pp. 3–36.

b) It distributes the emphasis to increase sales not uniformly but rather in proportion to the sales potentials of the particular product.

c) It informs the sales organization and management by providing information regarding the importance of various factors affecting the sales of a given product.

d) It enables the measurement of the effect of various kinds of selling and advertising effort.

Perhaps the most important aspects are indicated in (*c*) and (*d*) above. Diligent application of the more scientific methods have revealed many economic tendencies, knowledge of which not only makes clearer the difficulties inherent in the earlier methods of quota-setting but should be of great value in planning the sales program for a given product or group of products. Herein lies perhaps the most distinct advantage of this method, namely, its opening up of new vistas of knowledge about market and sales variance that are never completely exhausted. When, in earlier undertakings, the measures of the geographic market were assumed from the beginning, no further progress could be made than the accomplishment or lack of accomplishment of those objectives. In contrast, the continual analysis of sales and market phenomena opens a well of never-ceasing new knowledge as one aspect after another is examined. Our objective is, in fact, to present the results of delving first in one part of the field, then in another, and if possible to connect them together logically so as to show their implications in quota determination and in the broader field of sales planning.

WHY LIFE INSURANCE SALES VARY REGIONALLY

A painstaking analysis of all life insurance sales in the forty-eight states[12] during the year 1927 was made in order to show more clearly our general approach to the problem of why sales vary regionally. The per capita sales of life insurance range from $25.50 in Mississippi to $154.30 in New York. States having low per capita sales are more numerous and the entire series vary geometrically, in the same manner as a sum of money compound-

[12] The Life Insurance Sales Research Bureau, Hartford, Conn., compiles and distributes this information on request.

ed annually at a certain rate. Therefore, the series is expressed in logarithms in order to make better correlation analysis possible.[19]

Coming directly to the question of what different geographic conditions affect the per capita sales of life insurance, variation in personal income is the first to consider because it may logically be

TABLE V

PER CAPITA SALES OF LIFE INSURANCE BY STATES

A. ACTUAL VALUES		B. LOGARITHMIC VALUES	
Class Interval	Number	Class Interval	Number
$ 25–$ 50	21	1.41–1.56	8
50– 75	17	1.56–1.71	13
75– 100	8	1.71–1.86	14
100– 125	1	1.86–2.01	11
125– up	1	2.01–up	2
.....	48	.....	48

expected to have a definite effect. Probably the best single measure of personal income is the number of income tax returns per 100 people.[20] After using the simple charts *A* and *B*, of Chart III

[19] This fact is also borne out by a coefficient of variation of 41.1 per cent in the actual per capita insurance sales, as compared with 9.9 per cent in the corresponding logarithms. In each case, this measurement is obtained by calculating the percentage ratio of the absolute variability (σ) to the mean value. The computations were $\frac{23.89}{58.17} \times 100 = 41.1$ per cent and $\frac{.1713}{.1731} \times 100 = 9.9$ per cent.

For further analysis, the logarithms will give better correlation results because the logarithmic distribution is more "normal."

[20] Like the insurance sales per capita, income tax returns per 100 people show a pronounced skew distribution which was corrected by the use of logarithms.

NUMBER OF INCOME TAX RETURNS PER 100 PEOPLE, 48 STATES, 1926

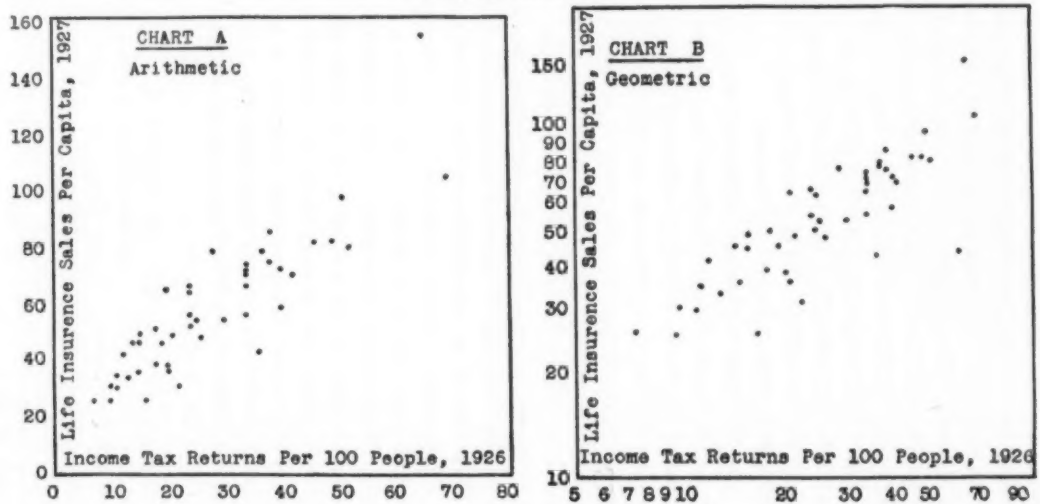
(A) ACTUAL VALUES		(B) LOGARITHMIC VALUES	
Class Interval	Number	Class Interval	Number
0–15	9	.87–1.06	5
15–30	19	1.07–1.26	9
30–45	13	1.27–1.46	14
45–60	4	1.47–1.66	14
60–75	3	1.67–1.86	6

The coefficient of variation for the actual values was 51.9 per cent as compared with 16.6 per cent for the logarithms.

CHART III

RELATIONSHIP OF INSURANCE SALES TO INCOME TAX RETURNS

(Forty-eight states, 1927)



to observe the relationship[21] the coefficient of correlation proved to be +0.8350. The square of this coefficient indicates that variation in income explains almost 70 per cent of the variation in per capita insurance sales, assuming, of course, that the income series does not reflect other influences besides purchasing power.

This assumption is not fully tenable. Further tests show that some of the influence credited to this income factor belongs to one or more other factors. What are the possible factors to consider in endeavoring to make a complete explanation of the variation in per capita insurance sales?

A. *Number of personal income tax returns*[22] *per 100 people, 1926 (logs.).*—This factor takes into account the variation in the relative number of persons receiving minimum incomes sufficient to require the making of reports to tax authorities.

B. *Average income per tax return, 1926*[22] *(logs.).*[23]—This factor should be the complement of the first because of its measurement of the average reported income. It fails to take into account either the variation in average size of income below the minimum requirement or the range of variation in reported incomes.

C. *Percentage of all school children, aged 16–18 years*[24] *(logs.), 1920.*—This factor is chosen for the purpose of allowing for variation in "prospectiveness," or people's valuation of the future. The action of parents in sending their children to school beyond the compulsory school age so as to prepare them for greater success during life is a reflection of their valuation of preparedness for the future. It may reflect the geographic variation in people's desire to forego present consumption by investing in life insurance for the purpose of providing for old age and for a family in the event of death.

[21] Correlation charts enable observation of whether the different series should be expressed in logarithms so as to obtain better measures of the relationships existing between them.

[22] Bureau of Internal Revenue, U.S. Treasury Department, *Statistics of Income for 1926.*

[23] For this and succeeding factors the test of whether they vary arithmetically or geometrically will not be given.

[24] United States Bureau of Census, 1920, *Population Composition and Characteristics,* III, 34–39, Table 10.

D. *Percentage illiterate of each state's population, 1920*[25] *(log.).*—It may be assumed that uneducated people have a more immediate outlook on life and would, therefore, be less likely to mortgage the present for the future, income and other factors being equal.

E. *Percentage Negro of total population, 1920*[26] *(log.).*—The purpose is to test whether variation in this racial characteristic is associated with the differences in the per capita life insurance sales.

F. *Percentage foreign-born of total population, 1920*[27] *(log.).*—This factor makes possible a test of whether the areas having higher percentages of foreign-born or, in other words, relatively less native-American stock, tend to buy more or less than an average amount of life insurance. Because foreign-born people have different characteristics, this factor may only show whether, on the average, they buy more or less than native Americans, other factors held constant.

G. *Density of population,*[28] *represented by the number of people per 10 square miles (log.).*—As measured by this factor the hazards of life, associated with the complex activities of the more densely populated areas, should be reflected in the per capita life insurance sales. This factor, as mentioned later, may reflect variation in the feeling of responsibility of one sex to another in providing for life-risk. Again, it may indicate the effect of variaton in the accessibility of the population to organized selling effort. In short, density of population may be a composite factor.

In testing the importance of the above factors it is necessary to calculate the coefficients of simple correlation between each factor and per capita insurance sales and also between the different factors. These measurements are presented in Table VI.

Some of the intercorrelations are worthy of study. A coefficient of +0.80 indicates that the areas of high income are also areas where relatively more foreign-born live. The average income per tax return is higher in the more densely populated areas ($r = +0.70$). The percentage illiterate is directly correlated with percentage Negro ($r = +0.78$). The latter is negatively correlated

[25] *Ibid.* [26] *Ibid.* [27] *Ibid.*

[28] United States Bureau of the Census, 1920, *Population Number and Distribution*, I, 29, Table 16.

with percentage foreign-born ($r = -0.70$), indicating that these two classes of people do not live in the same areas and may be the complement of each other in labor supply. The significance of these and other intercorrelations in this study will presently be seen.

TABLE VI

INTERCORRELATIONS

(Per Capita Insurance Sales, 1927)

	Average Income per Taxpayer, 1926 (log.)	Percentage of School Children, aged 16–18 Years, 1920 (log.)	Percentage of Illiterate, 1920 (log.)	Percentage of Negroes, 1920 (log.)	Percentage of Foreign-Born, 1920 (log.)	Population Density Per 10 Square Miles, 1920 (log.)	Life Insurance Sales per Capita, 1927 (log.)
Number of income tax returns per 100 people, 1926 (log.)	+0.3480	−0.3066	−0.4013	−0.4212	+0.8009	+0.1252	+0.8350
Average Income per taxpayer, 1926 (log.)	.....	−0.6432	+ .2128	+ .3939	+ .0640	+ .7010	+ .5235
Percentage of school children, aged 16–18 years, 1920 (log.)	.....	.....	−0.2622	− .2632	− .1662	− .7011	− .3880
Percentage of illiterate, 1920 (log.)	.....	.....	.....	+0.7781	− .6036	+ .1914	− .4957
Percentage of Negro, 1920 (log.)	.....	.....	.....	.....	− .7016	+ .3572	− .3513
Percentage of foreign-born, 1920 (log.)	.....	.....	.....	.....	.....	−0.0624	+ .6650
Population density per 10 square miles, 1920 (log.)	.....	.....	.....	.....	.....	.....	+0.4109

Among the coefficients of correlation between life insurance sales and the respective factors several are of special interest. The percentage of school children, aged 16–18 years, presents a negative correlation ($r = -0.39$) with per capita life insurance sales, while percentage foreign-born appears to exert a rather high direct influence ($r = +0.66$). Study of the intercorrelations between these and other factors makes it possible to understand why these correlations are obtained. For example, the percentage of school children, aged 16–18 years, is usually high in areas where the density of population is low and vice versa ($r = -0.79$). Also it is negatively correlated with the two income factors. When these facts are considered in conjunction with the quite positive correlations between insurance sales and the density factor and the two income factors, the negative association between the school attendance data and per capita life insurance sales is not unexpect-

ed. These conflicting intercorrelations tend to obscure the true underlying effect of the school attendance of children beyond compulsory school age as a measure of people's valuation of the future. Given a number of areas with the same density of population, income, and other conditions, what effect will differences in their "prospectiveness" as indicated by this school-attendance factor have upon the per capita purchases of insurance? Since comparisons cannot be made without a sufficient number of areas that are alike except in school attendance, this fundamental question must be stated somewhat differently: What is the effect of variation in any given factor, such as prospectiveness, when the effects of all other known factors have been eliminated? This question may be answered by using partial and multiple correlation methods carefully and logically.

Application of these methods showed that the seven factors together explained 89.5 per cent of the variation in the per capita sales of life insurance ($R=0.9462$). Chart IV makes it possible to observe the close conformity of actual sales to the corresponding state estimates based on the weighted values of the factors and also the direction and degree of influence of the respective factors. The coefficients contained in Table VII are helpful in this respect.

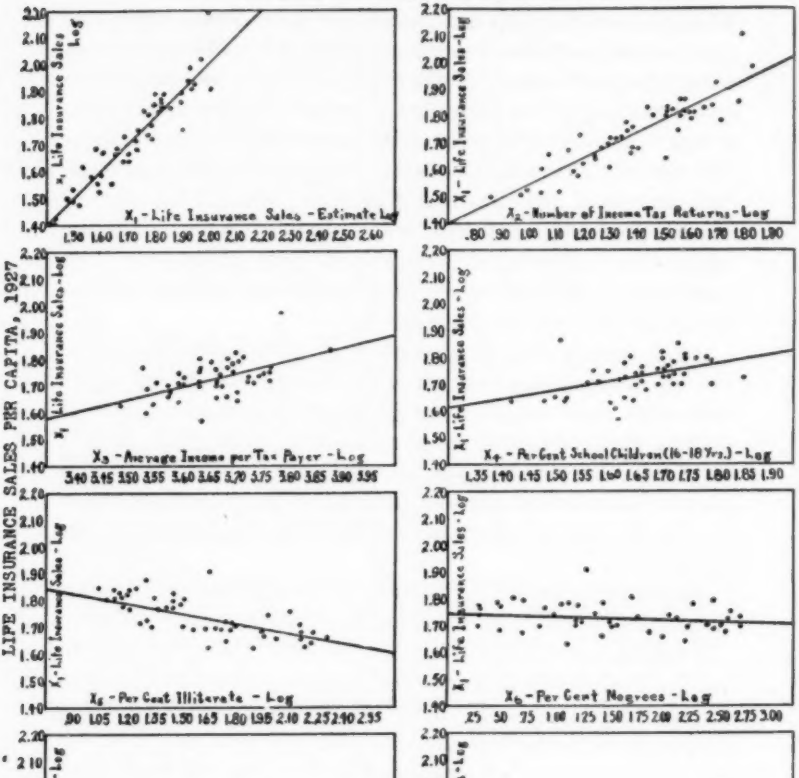
As previously stated, the coefficients of simple correlation merely measure the association between the corresponding series without making any allowance for a common influence upon them. In each case, the corresponding coefficient of partial correlation, in the second row, allows for the conflicting influences of the other factors in the study (but not of outside factors) and so provides a much more accurate indication of the direction and importance of the factor's influence. The most noteworthy changes in the results are as follows:

a) The correlation for the measure of prospectiveness (percentage of school children over the compulsory school age) changed from -0.39 to $+0.24$. From a logical standpoint, the change in direction of influence is more significant than the size of the latter coefficient. Since this factor is correlated negatively with average income per return and with population density, and the latter factors are positively correlated with insurance, it is obvious that the simple correlation of percentage of children in school would

CHART IV

INSURANCE SALES AND SEVEN REGIONAL FACTORS

(Combined And Separate Relationships, 1927)


LIFE INSURANCE SALES PER CAPITA, 1927
X1 - Life Insurance Sales - Estimate Log
X2 - Number of Income Tax Returns - Log
X3 - Average Income per Tax Payer - Log
X4 - Per Cent School Children (16-18 Yrs.) - Log
X5 - Per Cent Illiterate - Log
X6 - Per Cent Negroes - Log
X7 - Per Cent Foreign Born - Log
X8 - Density of Population - Log

tend to be negative. After allowing for these other influences, however, the underlying relationship of "prospectiveness" to insurance sales is positive.

b) The correlation for percentage of Negroes changed from −0.35 to −0.08. This is because the income factors, which are highly correlated with insurance, are negatively associated with Negro. Also, illiteracy and Negro factors are directly correlated. When allowance is made for these other factors, this racial class appear as average buyers of insurance.

c) The correlation for percentage of foreign-born changed from +0.67 to −0.03, or a change in importance from second to last place. Here again allowances have been made for the negative intercorrelation of foreign-born with income and with illiteracy, due to regional location in both cases.

The reasons for choosing the various factors have previously been given. These tests show five of them to be significant and

TABLE VII

RELATIONSHIP OF PER CAPITA LIFE INSURANCE SALES TO SEVEN FACTORS
(As Indicated by Various Statistical Coefficients)

Statistical Coefficient	Number of Income Tax Returns per 100 People x_2	Average Income per Return x_3	Percentage of School Children Aged 16–18 Years x_4	Percentage of Illiterate x_5	Percentage of Negroes x_6	Percentage of Foreign-Born x_7	Density x_8
Simple correlation (r)	+0.8350	+0.5235	−0.3880	−0.4957	−0.3513	+0.6650	+0.4199
Partial correlation (r)	+ .7153	+ .3578	+ .2352	− .4420	− .0794	− .0300	+ .5009
Part correlation	+ .8925	+ .5553	+ .4466	− .6038	− .1724	− .0754	+ .7694
Part determination	.7966	.3084	.1995	.4407	.0297	.0057	.5920
Path coefficient (B)	+ .6403	+ .2162	+ .1616	− .2873	− .0503	− .0235	+ .3807
Partial determination (B_r)	+ .5340	+ .1132	− .0627	+ .1424	+ .0198	− .0156	+ .1636
Direct (B^2)	.4100	.0467	.0261	.0825	.0032	.0006	.1519
Total joint	+ .1246	+ .0065	− .0888	+ .0599	+ .0166	− .0162	+0.0117
Allowance for joint relationship with each other factor							
x_2	+ .0482						
x_4	− .0317	− .0224					
x_5	+ .0738	− .0132	+ .0122				
x_6	+ .0152	− .0048	+ .0024	+ .0126			
x_7	− .0121	− .0003	+ .0006	− .0041	− .0009		
x_8	+0.0312	+0.0591	−0.0498	−0.0214	−0.0078	+0.0006	

confirm the direction of association originally assumed. The comparative importance of the different factors may now be examined briefly.

By ranking three sets of coefficients[29] a surprising unanimity of agreement regarding the importance of the seven factors is obtained (Table VIII). Two factors, percentage of Negroes and per-

[29] A brief explanation of these statistical coefficients is appended.

centage of foreign-born, rank lower than the others and their coefficients are of no statistical significance.

By obtaining estimates[30] based on the combined effects of the seven factors for the respective states and subtracting them from the corresponding actual per capita sales (logs.) a series of deviations (Table IX, col. 6) is obtained containing

a) Possible curvilinear tendencies in known relationships;
b) The effects of unknown factors; and
c) Possible errors in the arithmetical values of the respective series.

The curvilinear tendencies are to be found by plotting the deviations around the lines of relationship at points corresponding to

TABLE VIII
RANKING OF FACTORS' IMPORTANCE AS INDICATED BY THREE IMPORTANT COEFFICIENTS

Factor	Partial r's	Path Coefficients*	Coefficient of Determination
x_2 No. income tax returns...	1	1	1
x_3 Average income.....	4	4	4
x_4 Percentage of children....	5	5	5
x_5 Percentage of illiterate....	3	3	3
x_6 Percentage of Negroes....	6	6	6
x_7 Percentage of foreign-born.	7	7	7
x_8 Density.....	2	2	2

* Path coefficients always rank the same as the coefficients of part correlation and part determination.

the values of the respective factors. Observing the conformation of the dots representing states on Chart IV, there may be slight curvilinear tendencies in the relationship of sales to income tax returns and population density.

[30] Letting x_2, x_3, x_4, etc., represent the factors, the formula for obtaining the estimate for each area is

$$-1.1931+.4696x_2+.4689x_3+.3140x_4-.1307x_5-.0116x_6-.0068x_7+.1082x_8=x_1.$$

The means and standard deviations, required in the construction of the estimating formula, are as follows:

x	M	σ	x	M	σ
x_1	1.7312	.1713	x_5	1.6360	.3765
x_2	1.4010	.2336	x_6	1.3929	.8251
x_3	3.6631	.0789	x_7	1.8612	.5843
x_4	1.6583	.0882	x_8	2.5029	.6172

TABLE IX

COMPARISON OF LIFE INSURANCE SALES AND SALES ESTIMATES*

(Actual per Capita Values and Logarithms, by States, 1927)

	(1) Actual Sales per Capita	(2) Estimated Sales per Capita	(3) Percentage Actual of Estimated	(4) Log Sales per Capita	(5) Log Estimated Sales per Capita	(6) Log Sales Minus Log Estimates
Alabama	$ 30.1	$ 33.1	90.9	1.48	1.52	−0.04
Arizona	31.4	30.9	101.6	1.50	1.49	+ .01
Arkansas	30.6	31.6	96.8	1.49	1.50	− .01
California	103.9	95.5	108.8	2.02	1.98	+ .04
Connecticut	81.8	87.1	93.9	1.91	1.94	− .03
Colorado	71.2	64.6	110.2	1.85	1.81	+ .04
Delaware	85.3	85.1	100.2	1.93	1.93	.00
Florida	58.6	61.7	95.0	1.77	1.79	− .02
Georgia	34.7	31.6	109.8	1.54	1.50	+ .04
Idaho	48.7	46.8	104.1	1.69	1.67	+ .02
Illinois	97.4	87.1	111.8	1.99	1.94	+ .05
Indiana	52.0	61.7	84.3	1.72	1.79	− .07
Iowa	64.8	60.3	107.5	1.81	1.78	+ .03
Kansas	51.0	53.7	95.0	1.71	1.73	− .02
Kentucky	34.1	39.8	85.7	1.53	1.10	− .07
Louisiana	38.4	37.1	103.5	1.58	1.57	+ .01
Maine	54.2	60.3	89.9	1.73	1.78	− .05
Maryland	70.0	74.1	94.4	1.84	1.87	− .03
Massachusetts	80.5	102.3	78.7	1.91	2.01	− .10
Michigan	74.5	67.6	110.2	1.87	1.83	+ .04
Minnesota	66.2	57.5	115.1	1.82	1.76	+ .06
Mississippi	25.5	26.9	94.8	1.41	1.43	− .02
Missouri	77.5	64.6	120.0	1.89	1.81	− .08
Montana	53.5	49.0	109.2	1.73	1.69	+ .04
Nebraska	56.0	55.0	101.8	1.75	1.74	+ .01
Nevada	44.0	51.3	85.8	1.64	1.71	− .07
New Hampshire	56.0	79.4	70.5	1.75	1.90	− .15
New Jersey	82.4	89.1	92.5	1.92	1.95	− .03
New Mexico	26.3	26.9	97.8	1.42	1.43	− .01
New York	154.3	102.3	150.8	2.19	2.01	+ .18
North Carolina	41.5	34.7	119.6	1.62	1.54	+ .08
North Dakota	49.0	38.9	126.0	1.69	1.59	+ .10
Ohio	69.6	67.6	103.0	1.84	1.83	+ .01
Oklahoma	45.5	51.3	88.7	1.66	1.71	− .05
Oregon	72.7	67.6	107.5	1.86	1.83	+ .03
Pennsylvania	72.1	79.4	90.8	1.86	1.90	− .04
Rhode Island	77.7	79.4	97.9	1.89	1.90	− .01
South Carolina	25.8	24.6	104.9	1.41	1.39	+ .02
South Dakota	39.0	39.8	98.0	1.59	1.60	− .01
Tennessee	46.3	40.7	113.8	1.67	1.61	+ .06
Texas	36.2	43.6	83.0	1.56	1.64	− .08
Utah	48.4	55.0	88.0	1.68	1.74	− .06
Vermont	64.2	60.3	106.5	1.81	1.78	+ .03
Virginia	36.2	38.9	93.1	1.56	1.59	− .03
Washington	78.2	69.2	113.0	1.89	1.84	+ .05
West Virginia	45.7	45.7	100.0	1.66	1.66	.00
Wisconsin	65.9	66.1	99.7	1.82	1.82	.00
Wyoming	43.2	49.0	88.2	1.64	1.69	−0.05
Average			83.10			

* The estimates were made in logarithms (col. 5) using the formula, footnote, p. 252. The actual values were then placed in column 2 in order to facilitate comparisons.

Since these deviations also indicate what the variations in insurance sales would be if uninfluenced by the seven factors, they enable clearer testing for new relationships independent of those already found. Some of these tests deserve mention.

a) Percentage urban of total population,[31] representing the relative population in towns and cities over 2,500 in size was used because two or more areas might have the same population density, but a varying concentration of population. The idea that it might reflect risks of city living better than the density factor was not borne out.

b) Average number of persons per family,[32] in the different states had no apparent influence on per capita insurance sales.

c) The percentage of population 5 to 24 years old,[33] as a measure of the comparative age of the people in the respective states had no apparent relationship to life insurance sales.

d) The ratio of males to females,[34] and the relative number of married males[35] used as measures of variation in men's sense of responsibility in providing for widows and families, showed no additional effect on insurance sales. However, these tests do not prove conclusively that there is no influence of this nature. The ratio of males to females is higher, and the percentage of married males is lower in the more sparsely populated states. It may well be that the density factor, through its positive effect, has already allowed for this supposed influence. Nevada and Wyoming, which show the highest ratios of males to females and very low percentages of married males, have lower than normal per capita sales after allowing for density and other factors. It must not be overlooked that inaccessibility might also reduce life insurance sales in these two states.

Probably other conditions have an influence upon insurance sales. For example, salaries and rents[36] paid by insurance companies are considerably lower in small cities than large. These tendencies in expenses may affect per capita sales through variation of economical sales coverage, but the state data are not available to prove the point in the case of insurance.

From this intensive analysis the conclusion seems warranted that the regional rates of life insurance sales are highly associated with a small group of market factors, several of which appear

[31] United States Bureau of the Census, *Abstract, 1920*, Table 15, p. 75.

[32] *Ibid.*, Table 152, p. 459.

[33] *Ibid.*, Table 49, p. 147.

[34] *Ibid.*, Table 37, p. 122.

[35] *Ibid.*, Table 55, p. 228.

[36] H. E. Niles, "Rents and Salaries in Ninety-six Cities," *Harvard Business Review*, II (January, 1928), 194–97.

highly influential. Their influence may be combined so that estimates of insurance sales per capita may be obtained for the respective areas. Since these estimates are based on the probable association of the known factors, they may be regarded as the normal sales to be expected. The regional sales of individual companies may be compared with them, assuming their general comparability.

NOTE.—The coefficient of partial correlation is a good measure of the independent association between two series, but it does not show perfectly the comparative importance of several factors in a study. By its nature, it is the correlation between the variations in insurance and the given factor after the effect of the variations in other factors have been eliminated from both series. If all the factors in the study are highly correlated with the dependent series, e.g., insurance sales, the holding constant of the effect of all but one may leave a very high correlation for this one, but it may still be a very minor factor as compared with the total variation in insurance sales. On the other hand, when two factors contain a common influence, the holding constant of the effect of one may eliminate most of the other's correlation and vice versa, thereby causing low correlations. Clearly, then, its greatest usefulness is only where the multiple correlation is very high or perfect and where the factors used are independent. Departure from this ideal condition reduces this coefficient's value.

The coefficient of part correlation differs from that of partial correlation in that it measures the relationship between any factor and the dependent series after allowing for the effect of other factors only upon the latter (D. R. G. Cowan, "A Note on The Coefficient of Part Correlation," *Journal of the American Statistical Association*, XXVII, No. 178 [June, 1932], 177–79). The squares of these values are the coefficients of part determination and measure the proportion of the dependent factor's variation, remaining after allowing for the net effects of the other variables, which is explained by adding the additional factor to the study. Like the partial correlation coefficient this measure is more reliable when the factors used are fairly independent.

Two other rows of coefficients are contained in Table VII. Each path coefficient, contained in the table's third row, indicates the fraction of change to be expected with a given change in a factor after the effect of variations in other factors in the study have been eliminated from both and also after allowance has been made for the difference in their original variability. (The partial correlated coefficient differs in that it allows for difference in the average variability of the two series after the effect of the variations in the other factors in the study have been eliminated.)

The fourth row contains the coefficients of partial determination which are said to indicate, respectively, the fraction or percentage of the variability in per capita insurance sales ascribable to the variation of each particular factor. Although their algebraic sum gives the fraction or percentage of the total variability in the dependent factor, their validity is the subject of dispute between statisticians. Because they are so easily understood, their use is desirable in some circumstances. The direct and joint influences which compose them and which are to be found in the lower half of Table VII, are also useful in the analysis of the interrelationships of the factors.

LOAN AMORTIZATION PLANS OF BUILDING AND LOAN ASSOCIATIONS

FRANKLIN W. RYAN AND RALPH S. WEESE[1]

DURING the last few years of gradual transition and evolution in policies and objectives of building and loan associations in the United States, the attention of building and loan executives has been increasingly focused on plans and schedules of amortization, with a growing recognition that one of the outstanding present-day issues involved is related to the general problem of three different alternative categories or classes of time-payment systems generally known respectively as (1) the serial or sinking fund plan, (2) the drop-share or cancel-and-indorse plan, and (3) the direct reduction plan by which share accounts are eliminated. These three classifications include nearly all of the varieties of loan amortization used by building and loan institutions today, although there are several other minor varieties derived from particular features of all of them or partly based on compromises with the straight loan or term loan plan in which the entire loan and interest is liquidated in one final payment.

The purpose of the present article is to present in exactly parallel vertical tables, complete schedules for each of these three distinctive plans of loan amortization as used by building and loan associations, so that their basic characteristics month by month, can be studied and compared. The actual effective rate of interest in all three of the plans is exactly 6 per cent per annum.

Fortunately, in connection with this question of amortization plans, there is no disagreement as to the mathematical theory involved. Practically all building and loan associations use the

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actuarial or compound interest theory for assuming the mathematical ratio of the amount of interest to the amount of principal in each periodic payment, while the simpler constant ratio theory is never used. This latter theory does not differentiate between the present value and the future value of money, but, with limitations, may be used in connection with small loans of around a year or less in duration. Since loans by building and loan associations usually average between $2,000 and $3,000, and normally run for several years, it is obviously unsound to use the constant ratio theory for purposes of working out amortization tables in connection with them.

Table I shows the traditional sinking fund plan of loan amortization, which is historically the oldest of the three plans. Table II shows the drop-share or cancel-and-indorse plan, and finally Table III gives the schedules of the direct reduction plan. In each of the three tables, the first column gives the ordinal numbers of each month at the end of which the periodic payments are made to the lender. The drop-share or cancel-and-indorse plan of Table II is a transition or compromise between the earlier sinking fund plan and the direct reduction plan and, for that reason, its analysis and discussion will be delayed until after the other two plans have been described.

Taking a loan of $3,000 as the typical loan, at the typical rate of 6 per cent per annum, each of the three amortization schedules is constructed on the basis of equal monthly payments of $30 each for 138 months, and on the basis of exact mathematical calculations, a final 139th payment of $29.27.[2]

Under the actuarial theory of loan payments, it requires 138.9757 months or 11.581 years to pay off a loan at 6 per cent per annum, when each monthly payment (made up of both principal and interest) except the last, is an even sum equal to one-hundredth of the original principal loaned.

In these three parallel tables, it is necessary, for purposes of clearness and exactness, to use figures as near as possible to the correct mathematical calculations. Both interest and dividends were calculated to five decimal places and later rounded out or

[2] The tables were calculated for this article by Ralph S. Weese.

adjusted to the nearest cent. If, as is a frequent custom, interest is figured to whole numbers in the case of *any* fraction of a cent, and if dividends are figured in the opposite way, by disregarding all such fractions, both of which practices are in favor of the lender, it would be impossible to calculate the three schedules on an exactly parallel basis.

Furthermore, in this study, the borrower is assumed always to be prompt in paying exactly on the day agreed upon, so that no fines, late charges, forfeitures, penalties, or other similar adjustments can destroy the exact parallelism of the series of monthly payments in the three schedule.

It should be explained, at the outset, that these three schedules are given here in parallel form primarily for illustrating the exact mathematical correspondence between any particular set of monthly payments of the three plans, and not for the purpose of giving the impression that each one of the three schedules is widely prevalent in actual building and loan practice today. Nevertheless, the three schedules represent actual practice.

In Table I, the sinking fund plan here shown assumes that dividends on the shares will be 6 per cent a year, which is the same as the interest on the loan, whereas in actual practice today, under depression conditions, dividends paid on shares are seldom more than half of the interest rates on the loan. Similarly, the drop-share or cancel-and-indorse plan here shown in Table II assumes that dividends on shares are also equal to the interest on the loan, whereas in actual practice today, building and loan associations making amortization loans under the drop-share plan pay no dividends at all in most cases.

In other words, with the exception of the direct reduction schedule in Table III, the accompanying set of three loan schedules is not in accordance with prevalent general building and loan practice at the present time, although there are isolated cases where dividends on shares equal to interest rates on loans are paid by building and loan associations making loans on these share account plans.

If these three schedules were to be individually shown in a manner that would illustrate typical present-day practice

throughout the United States, the serial or sinking fund plan would show an annual dividend rate of about 3 per cent and would run for 164 months or more, instead of 139 months; the drop-share or cancel-and-indorse plan would show no dividends at all and would run 141 months; while the direct reduction plan would show monthly payments accumulated for six months' periods so that payments on interest and principal would be credited semiannually instead of monthly, similarly lengthening the period of the loan to 141 months. But if these schedules were to be shown on that basis, the fundamental points of mathematical correspondence between them could not be brought out and explained, which is the basic purpose of the present study.[3]

SINKING FUND PLAN

The share-accumulation sinking fund plan is historically the oldest plan used by American building and loan associations, and originated among the earliest associations founded in this country. Under this plan, as shown in Table I, the amount of the original principal borrowed is $3,000, on which the borrower contracts to pay interest at 6 per cent per year, which is ½ of 1 per cent a month, so that the interest payments on this $3,000 loan are $15 per month. This $15 monthly payment of interest remains the same for every month the loan is outstanding, because it is technically a straight or term loan and remains outstanding during the entire period of the amortization schedule and is finally paid off in full at maturity.

The basic characteristic of this plan which gives it its distinctive name "Sinking Fund Plan" is that at the same time the borrower is paying $15 monthly interest on this $3,000 loan, he is accumulating a sinking fund by a series of monthly payments of $15 a month, which will be sufficient for the final payment of the loan at maturity. This additional monthly payment of $15 makes each total monthly payment $30 for both interest and the payment on the shares subscribed for.

In Table I, it is assumed that dividends are credited and com-

[3] See Franklin W. Ryan, "Plans of Loan Amortization," *Federal Home Loan Bank Review*, March, 1935.

pounded monthly on the credit balance in the share account at the same rate as the rate of interest the borrower pays on the loan, namely, ½ of 1 per cent a month. This plan has the effect equivalent to ½ of 1 per cent monthly compound interest, so that at the end of 138 equal $15 monthly payments and a partial 139th payment of $14.27, the total credit balance in the share account reaches $3,000, which is the amount of the sinking fund necessary to pay the $3,000 loan in full.

On this plan, the exact length of time necessary to accumulate the sinking fund to pay the loan, is determined by the size of the monthly payment on shares and the rate of dividends credited monthly on the balance in the share account. Mathematical calculations show that a series of $15 monthly payments with dividends credited and compounded at 6 per cent will require 138.9757 months to amount to the sum of $3,000. In Table I, the $15 monthly payment of interest at 6 per cent per annum and the $15 monthly payment on shares at the same rate happen to be equal to each other, but it is obvious that the two elements of the monthly payment could be unequal in amount in most cases.

The sinking fund plan as here scheduled in Table I involves a net cost to the borrower of 6 per cent per annum if the dividends are credited also at 6 per cent at the same intervals of time as the interest is charged. But if the dividends are at a lower rate or if all dividends are omitted, the net cost to the borrower is considerably increased.[4]

Furthermore, since under this plan the dividends are not actually paid in real money, but are nothing more than mere bookkeeping entries, there has been in recent years a tendency to simplify the figures of the amortization process by offsetting the dividend entries against the two series of debit entries for pay-

[4] For example, if the dividend rate is 3 per cent per annum credited semiannually, the effective rate of interest on a 6 per cent loan under the serial or sinking fund plan is 7.92 per cent. If no dividends are credited at all, then the $15 monthly payments toward the accumulation of the sinking fund must continue until these payments amount to the $3,000 necessary to pay the loan at maturity. Dividing $3,000 by $15, it is found that the number of months required under such a plan without crediting dividends would be 200 months. On a loan with a nominal rate of 6 per cent, this would raise the effective rate of interest to 9.56 per cent.

ments on principal and interest, to arrive at the net results of the direct reduction plan as shown in Table III.

DIRECT REDUCTION PLAN

The direct reduction schedule of amortization in Table III is as simple as possible. It has no share accounts because the borrower does not subscribe to shares. It has no accumulation of a sinking fund, no record of dividend credits, and no uncertainty as to maturity date.[5] For every monthly $30 payment the borrower makes, he receives full credit immediately. At 6 per cent per annum, he pays interest at the rate of ½ of one per cent per month on the amount of principal outstanding each month and after this is credited, the remainder of each $30 monthly payment is credited toward the reduction of the loan.

The two elements of each monthly payment are easily calculated by multiplying the balance of the principal debt outstanding at the end of each month by the monthly rate of interest (the annual rate divided by 12). This calculated monthly interest payment is then subtracted from the $30 total to determine the amount of each monthly payment on the principal. Thus in each total monthly payment of $30, the ratio between the interest payment and the payment on principal shows a consistent decrease throughout the entire series of 139 payments.

At first sight, the two plans of Table III and Table I seem to be on different mathematical bases, but this is more apparent than real. It will be observed in each of the equal monthly payments of $30 in Table I, that the ratio of each monthly interest payment to each monthly payment on shares of stock remains constant, the interest being always $15 and each payment of stock being $15, whereas in each of the $30 monthly payments in Table III the ratio between the monthly interest payment and the payment on principal is not constant as is explained above. But although the schedules of figures in Table I appear to move toward a different final result from that of Table III, it

[5] There is always some uncertainty as to the maturity date under the share account plans because of the uncertainty that dividends will continue to be credited at the original rate.

will be found that if each monthly dividend credit entry in Column 7 of Table I is added to each $15 monthly payment on shares of stock in Column 6 of Table I, the resulting total will equal the corresponding figure in Column 5 of Table III, and, similarly, that if each dividend credit entry in Column 7 of Table I is subtracted from the corresponding interest figure in Column 5 of Table I, the resulting figure will be equivalent to the corresponding monthly figure in Column 4 of Table III, with possible occasional differences of one cent because of rounding. Thus, while from both a legal and an accounting point of view, it is correct to speak of the relation of principal and interest payments in Table I as a constant ratio, it is evident that from the point of view of final net results, this constant ratio is more apparent than real and somewhat of the nature of a mathematical fiction.

CANCEL-AND-INDORSE OR DROP-SHARE PLAN

The cancel-and-indorse or drop-share plan of loan amortization, as shown in Table II, is usually regarded as a compromise or transition stage between the sinking fund plan of Table I and the direct reduction plan of Table III. Building and loan associations have devised this system primarily for the purpose of approaching as nearly as possible to the direct reduction plan of Table III without abandoning the share account feature. Actuated by various motives, frequently based on state statutory requirements or on building and loan custom or tradition, they use this type of share account plan in order to keep up the minimum appearance of the membership feature. This is legally evidenced by the existence of these share accounts, no matter how small the total credit balance in them.

Referring to the schedule in Table II, it can be seen that the share account in Column 10 will never show a credit balance as great as $100 for more than a day or so, because just as soon as the credit balance accumulates to $100 or more, a $100 par value share of stock is canceled by applying $100 which has been accumulated in the share account toward the reduction of the principal debt. In Column 2 of Table II, it can be seen that when a $3,000 loan at six per cent per annum is made under this plan,

the borrower subscribes for 30 shares of $100 par value stock, the same as under the sinking fund plan, but that this share subscription is gradually reduced during the progress of the amortization schedule by a series of retirements and cancellations of $100 par value shares of stock, as shown in Columns 9 and 10.[6]

During the successive brackets of several months each, that credits are accumulating in the share account toward the retirement of each successive $100 share of stock under the drop-share plan, a constant ratio is assumed to exist between the interest payment and the payment on principal in each total monthly payment, which ratio is the indirect result of the series of bookkeeping entries for credits to shares and for dividends credited each month. This can be seen by studying the dividend credits in Column 7 of Table II in comparison with the corresponding figures for payments of principal in Column 5 of Table III. A similar offsetting relation can be seen by comparing Column 7 of Table I with Column 5 of Table III.

NET RESULTS THE SAME UNDER THE THREE PLANS

Under all three of the amortization schedules of a $3,000 loan at 6 per cent per annum, here presented for study, with equal monthly payments equivalent in amount to one-hundredth of the principal (12 per cent per year), the total amount of both principal and interest at 6 per cent, to be paid over the period of the loan can be mathematically calculated by multiplying the monthly payment ($30) by the number of months required (138.9757) by which process the total amount paid or $4,169.27 is found. Since the original principal of the loan in all three schedules is $3,000, it can be seen that the total net money cost paid for the use of this amount under the actuarial or compound interest theory, is $1,169.27 in all three plans.

[6] There is a considerable number of so-called drop-share plans of loan amortization which are used by various building and loan associations, the $100 par value plan, as shown in Table II, being merely the most convenient one for purposes of the present study. Obviously, any other amount, such as a $50 or a $30 plan, might be used. On the other hand, there are a great many drop-share plans which follow a time basis instead of a fixed amount basis and close out the accumulated balance in the share account at regular time intervals, such as quarterly, semiannually, or annually.

Under the direct reduction plan in Table III, this total cost of $1,169.27 can be found merely by totaling all the amounts of the 139 interest payments as shown in the interest column (Column 4).

Under the drop-share plan in Table II, this sum of $1,169.27 is found by totaling the interest payments in Column 5 ($1,204.50), and subtracting from this total the total dividends credited in column 7 ($35.23). ($1,204.50 − $35.23 = $1,169.27.)

Similarly, under the sinking fund plan in Table I, the total of dividends credited in Column 7 ($915.73) is subtracted from the accounting total of "interest paid" ($2,085.00) to get the actual final total cost of $1,169.27.

Under the sinking fund plan the total of dividends credited is $915.73 and under the drop-share plan the total of dividends credited is $35.23, but since under both of the assumed share account plans here presented, all dividend credits are merely bookkeeping entries and not paid in real money, the use of either of the share plans does not change the mathematical results as finally shown under the direct reduction plan. The two share account plans operate to make the amortization records considerably more complicated than under the direct reduction plan.

Note that at the end of any particular month, the total credits in the share account in Column 8 of Table I, and the total credits in the share account in Column 8 of Table II, and the total of principal repayments in Column 5 of Table III are all three identical in amount to the exact cent throughout the entire period.

Furthermore, at the end of any particular month, the figure in Column 3 of Table I minus the figure in Column 9 of Table I equals the similar difference obtained by subtracting the sum of both the figures in Columns 9 and 10 of Table II from the figure in Column 3 of Table II, and these two equivalent differences are also equivalent to the corresponding figure in Column 2 of Table III, dropped down one row.

That is, for the end of any month, the net differences between total current debits and total current credits are the same under all three plans.

Under all three of the amortization plans here presented, the

amount loaned, $3,000, and the annual rate of 6 per cent, are the same; the three series of payments of 138 equal payments of $30.00 each and a final payment of $29.27 follow the same schedules; the final aggregates of all payments totaling $4,169.27 are equal; and the actual net cost to the borrower of $1,169.27, is identical in all three schedules. Thus it is demonstrated that, regardless of the devices of the share accounts, the final net results under the share account plans, are the same as under a direct reduction loan.

THE ISSUE INVOLVED

The problem now remains as to which of the three amortization plans here presented is most practicable and desirable, but in view of the wide variations in building and loan laws and in trends of court decisions in the various states this problem is difficult to answer. It is obvious that statutes can be so framed as to legalize or to outlaw any plan of amortization. However, if the issues involved could all be reduced to questions of efficiency, simplicity, and practicability, and if state legislative enactments and court decisions could be subsidiary to such considerations, the answer is clear. The direct reduction plan is the best. It is obviously the simplest plan, it requires the least amount of calculations, it eliminates the complicated and quasi-fictitious bookkeeping entries of the share accounts, and, most important of all, it is easiest to understand not only by borrowers but also by building and loan employees who keep the records of the loans. Simplicity also reduces the possibilities of errors in accounting.

There are some who defend the share account plans in Tables I and II on the ground that by means of reducing dividend credits on shares in times of depression, the borrower can be made to pay a higher net charge on his loan than under the direct reduction plan if this is found necessary, but this argument is often questionable since in some cases, the borrower erroneously supposes that the crediting of any dividends at all reduces his cost below what it would be under the direct reduction plan. In the long run, nothing is gained by using a system which the borrower cannot understand.

Contrary to the general belief, the crediting of dividends on shares on either of the share account plans does not operate to reduce the net cost to the borrower at all if both the rate of interest charged and the rate of dividends credited are the same. Furthermore, if the rate of dividends on shares is less than the stated rate of interest on the loan, the share-account plans operate to increase the net cost to the borrower higher than it would have been under the direct reduction plan.

When either of the share-account plans is used, the dividend rates on shares must not only be at least equal to the stated rate of interest for the loan in order that the net amount charged the borrower shall be equivalent to the rate under the direct reduction plan, but such dividends must also be credited at the same intervals of time as when the interest is paid by the borrower.

LEGAL CONSIDERATIONS

From the point of view of the borrower of a building and loan association which has become insolvent, the direct reduction plan is very much to be preferred in most states because the decided weight of legal authority in such cases follows what is known as the Pennsylvania rule of settlement which, as stated in the case of *Smith* v. *Bath Loan and Building Association* ([Maine, 1927] 136 Atl. 284; 50 A.L.R. 526), is that

> . . . . the borrowing stockholder is entitled to credit on his loan for the amount of interest and premium paid by him, but is not entitled to have the amount of the dues paid by him on account of stock applied on his loan. Under this view, credits and debits relating solely to the borrower's rights and liabilities as a stockholder, such as dividends, withdrawal value of stock, and charges for losses and expenses, are not made, but are left until the final winding up of the association and the settlement with members-borrowers as well as non-borrowers. This view is admirably and concisely stated in *Rogers* v. *Hargo*, 92 Tenn. 35, 20 S.W. 430.[7]

On the other hand a few jurisdictions follow the so-called Maryland rule summarized in *Mott* v. *Western Savings and Loan Association* ([Oregon 1923] 20 Pac. (2d) 226, p. 239) as follows:

[7] See also *Cooper* v. *Newton* (C. C.) (Ga.) 160 Fed. 190; *Hale* v. *Phillips*, 68 Ark. 382, 59 S. W. 35; *Groover* v. *Pacific Coast Savings Society*, *supra*, with very extended note in which it is declared that the weight of authority favors the Pennsylvania rule.

There is another rule, designated the Maryland rule of settlement. The rule may be summarized as follows: In stating the account, the borrowing member should be credited with all sums paid by him to the association, whether as dues, premium, or interest, together with interest thereon, and should be charged with the sum advanced him by the association, together with interest thereon at the legal rate; the calculations being made on the partial payment plan. This rule has been followed in a number of federal jurisdictions and by the state courts of California, Maryland, Massachusetts, North Carolina, South Carolina, Texas, Utah, Washington, and in a qualified way in South Dakota. 4 Ann. Cas. 1081, Note.[8]

In addition to the Pennsylvania rule followed in the majority of American States, and the minority Maryland rule, there have been a considerable number of other types of court rulings in various jurisdictions, but these two outstanding categories of opinions are sufficient to reveal the two opposing trends of legal thought on the problem. The Pennsylvania rule, based on the legal and accounting technicalities involved, arrives at a conclusion which the average borrower ordinarily cannot understand, while the Maryland rule goes beyond these technicalities, recognizes the net actual results in such cases, and applies a principle of juristic economics. Clearly, from the borrower's standpoint, the direct reduction plan is to be preferred in the states whose courts follow the Pennsylvania rule.

But even in those few states whose courts are supposed to follow the Maryland rule, there is often the danger that the more widely accepted Pennsylvania rule may be adopted. In the state of North Carolina which was formerly supposed to follow the Maryland rule, there have been, in the last few years, several cases following the Pennsylvania rule. This trend is shown in the recent North Carolina case of *Penn* v. *King* ([N.C. 1932] 162 S. E. 376) in which the court said:

. . . . the monthly installments paid by him to the association should be applied to the payment of his dues as a shareholder, and not as credits on his indebtedness to the association.

[8] See also *Flinn* v. *Interstate Building and Loan Association* (C.C.) (S.C.) 141 Fed. 672; *Miles* v. *New South Building and Loan Association* (C.C.) (La.) 111 Fed. 946; *Manorita* v. *Fidelity Trust and Loan Co.* (C.C.) (Ala.) 101 Fed. 8; *City Loan and Building Association* v. *Goodrich*, 48 Ga. 445; *Preston* v. *Woodland*, 104 Md. 642, 65 Atl. 336, 10 Ann. Cas. 389; *Cook* v. *Kent*, 105 Mass. 246.

THREE PLANS OF AMORTIZATION OF A TYPICAL LOAN OF $3,000

At 6 per cent per annum

With total monthly payments equivalent to 1 per cent of original principal

TABLE I—SINKING FUND PLAN

Par value of shares: $100

(1) Months	(2) Shares	(3) Amount of Principal Outstanding During Month	(4) DISTRIBUTION OF MONTHLY PAYMENT: Monthly Payment at End of Month	(5) DISTRIBUTION OF MONTHLY PAYMENT: Interest on Principal Outstanding During Month	(6) DISTRIBUTION OF MONTHLY PAYMENT: For Purchase of Shares of Stock	(7) Dividends Credited on Share Account at End of Month	(8) Total Credits to Share Account at End of Month	(9) Current Cumulative Credit Balance in Share Account
1	30	$3,000.00	$ 15.00	$ 15.00	$	$ 15.00	$ 15.00	$ .....
2	3	3,000.00	30.00	15.00	80.07	15.00	30.07	80.07
3	3	3,000.00	30.00	15.00	0.23	15.00	15.15	45.22
4	3	3,000.00	30.00	15.00	0.23	15.00	15.23	60.45
5	30	3,000.00	30.00	15.00	0.30	15.00	15.30	75.75
6	30	3,000.00	30.00	15.00	0.38	15.00	15.38	91.13
7	30	3,000.00	30.00	15.00	0.46	15.00	15.46	106.59
8	30	3,000.00	30.00	15.00	0.53	15.00	15.53	122.12
9	30	3,000.00	30.00	15.00	0.61	15.00	15.61	137.73
10	30	3,000.00	30.00	15.00	0.69	15.00	15.69	153.42
11	30	3,000.00	30.00	15.00	0.77	15.00	15.77	169.19
12	30	3,000.00	30.00	15.00	0.84	15.00	15.84	185.03
13	30	3,000.00	30.00	15.00	0.93	15.00	15.93	200.96
14	30	3,000.00	30.00	15.00	1.00	15.00	16.00	216.96
15	30	3,000.00	30.00	15.00	1.08	15.00	16.08	233.04
16	30	3,000.00	30.00	15.00	1.17	15.00	16.17	249.21
17	30	3,000.00	30.00	15.00	1.25	15.00	16.25	265.46
18	30	3,000.00	30.00	15.00	1.33	15.00	16.33	281.79
19	30	3,000.00	30.00	15.00	1.41	15.00	16.41	298.20
20	30	3,000.00	30.00	15.00	1.49	15.00	16.49	314.69
21	30	3,000.00	30.00	15.00	1.57	15.00	16.57	331.26
22	30	3,000.00	30.00	15.00	1.65	15.00	16.65	347.92
23	30	3,000.00	30.00	15.00	1.74	15.00	16.74	364.66
24	30	3,000.00	30.00	15.00	1.82	15.00	16.82	381.48
25	30	3,000.00	30.00	15.00	1.91	15.00	16.91	398.39
26	30	3,000.00	30.00	15.00	1.99	15.00	16.99	415.38
27	30	3,000.00	30.00	15.00	2.08	15.00	17.08	432.46
28	30	3,000.00	30.00	15.00	2.16	15.00	17.16	449.62
29	30	3,000.00	30.00	15.00	2.25	15.00	17.25	466.87
30	30	3,000.00	30.00	15.00	2.33	15.00	17.33	484.20
31	30	3,000.00	30.00	15.00	2.42	15.00	17.42	501.62
32	30	3,000.00	30.00	15.00	2.51	15.00	17.51	519.13
33	30	3,000.00	30.00	15.00	2.60	15.00	17.60	536.73
34	30	3,000.00	30.00	15.00	2.68	15.00	17.68	554.41
35	30	3,000.00	30.00	15.00	2.77	15.00	17.77	572.18
36	30	3,000.00	30.00	15.00	2.86	15.00	17.86	590.04
37	30	3,000.00	30.00	15.00	2.95	15.00	17.95	607.99
38	30	3,000.00	30.00	15.00	3.04	15.00	18.04	626.03
39	30	3,000.00	30.00	15.00	3.13	15.00	18.13	644.16
40	30	3,000.00	30.00	15.00	3.22	15.00	18.22	662.38
41	30	3,000.00	30.00	15.00	3.31	15.00	18.31	680.69
42	30	3,000.00	30.00	15.00	3.40	15.00	18.40	699.09
43	30	3,000.00	30.00	15.00	3.50	15.00	18.50	717.59
44	30	3,000.00	30.00	15.00	3.59	15.00	18.59	736.18
45	30	3,000.00	30.00	15.00	3.68	15.00	18.68	754.86
46	30	3,000.00	30.00	15.00	3.78	15.00	18.78	773.64
47	30	3,000.00	30.00	15.00	3.87	15.00	18.87	792.51
48	30	3,000.00	30.00	15.00	3.96	15.00	18.96	811.47
49	30	3,000.00	30.00	15.00	4.06	15.00	19.06	830.53
50	30	3,000.00	30.00	15.00	4.15	15.00	19.15	849.68
51	30	3,000.00	30.00	15.00	4.25	15.00	19.25	868.93
52	30	3,000.00	30.00	15.00	4.34	15.00	19.34	888.27
53	30	3,000.00	30.00	15.00	4.44	15.00	19.44	907.71
54	30	3,000.00	30.00	15.00	4.54	15.00	19.54	927.25
55	30	3,000.00	30.00	15.00	4.64	15.00	19.64	946.89
56	30	3,000.00	30.00	15.00	4.73	15.00	19.73	966.62
57	30	3,000.00	30.00	15.00	4.83	15.00	19.83	986.45
58	30	3,000.00	30.00	15.00	4.94	15.00	19.94	1,006.39
59	30	3,000.00	30.00	15.00	5.03	15.00	20.03	1,026.42
60	30	3,000.00	30.00	15.00	5.13	15.00	20.13	1,046.55
61	30	3,000.00	30.00	15.00	5.23	15.00	20.23	1,066.78
62	30	3,000.00	30.00	15.00	5.33	15.00	20.33	1,087.11
63	30	3,000.00	30.00	15.00	5.43	15.00	20.43	1,107.54
64	30	3,000.00	30.00	15.00	5.53	15.00	20.53	1,128.07
65	30	3,000.00	30.00	15.00	5.64	15.00	20.64	1,148.71
66	30	3,000.00	30.00	15.00	5.74	15.00	20.74	1,169.47
67	30	3,000.00	30.00	15.00	5.85	15.00	20.85	1,190.32
68	30	3,000.00	30.00	15.00	5.95	15.00	20.95	1,211.27
69	30	3,000.00	30.00	15.00	6.06	15.00	21.06	1,232.33
70	30	3,000.00	30.00	15.00	6.16	15.00	21.16	1,253.49
71	30	3,000.00	30.00	15.00	6.27	15.00	21.27	1,274.76
72	30	3,000.00	30.00	15.00	6.37	15.00	21.37	1,296.13
73	30	3,000.00	30.00	15.00	6.48	15.00	21.48	1,317.61
74	30	3,000.00	30.00	15.00	6.59	15.00	21.59	1,339.20
75	30	3,000.00	30.00	15.00	6.70	15.00	21.70	1,360.90
76	30	3,000.00	30.00	15.00	6.80	15.00	21.80	1,382.70
77	30	3,000.00	30.00	15.00	6.92	15.00	21.92	1,404.62
78	30	3,000.00	30.00	15.00	7.02	15.00	22.02	1,426.64
79	30	3,000.00	30.00	15.00	7.13	15.00	22.13	1,448.77
80	30	3,000.00	30.00	15.00	7.24	15.00	22.24	1,471.01
81	30	3,000.00	30.00	15.00	7.36	15.00	22.36	1,493.37
82	30	3,000.00	30.00	15.00	7.47	15.00	22.47	1,515.84
83	30	3,000.00	30.00	15.00	7.58	15.00	22.58	1,538.42
84	30	3,000.00	30.00	15.00	7.69	15.00	22.69	1,561.11
85	30	3,000.00	30.00	15.00	7.80	15.00	22.80	1,583.91
86	30	3,000.00	30.00	15.00	7.92	15.00	22.92	1,606.83
87	30	3,000.00	30.00	15.00	8.04	15.00	23.04	1,629.87
88	30	3,000.00	30.00	15.00	8.15	15.00	23.15	1,653.02
89	30	3,000.00	30.00	15.00	8.26	15.00	23.26	1,676.28
90	30	3,000.00	30.00	15.00	8.38	15.00	23.38	1,699.66
91	30	3,000.00	30.00	15.00	8.50	15.00	23.50	1,723.16
92	30	3,000.00	30.00	15.00	8.62	15.00	23.62	1,746.78
93	30	3,000.00	30.00	15.00	8.73	15.00	23.73	1,770.51
94	30	3,000.00	30.00	15.00	8.86	15.00	23.86	1,794.37
95	30	3,000.00	30.00	15.00	8.97	15.00	23.97	1,818.34
96	30	3,000.00	30.00	15.00	9.09	15.00	24.09	1,842.43
97	30	3,000.00	30.00	15.00	9.21	15.00	24.21	1,866.64
98	30	3,000.00	30.00	15.00	9.33	15.00	24.33	1,890.97
99	30	3,000.00	30.00	15.00	9.46	15.00	24.46	1,915.43
100	30	3,000.00	30.00	15.00	9.58	15.00	24.58	1,940.01
101	30	3,000.00	30.00	15.00	9.70	15.00	24.70	1,964.71
102	30	3,000.00	30.00	15.00	9.83	15.00	24.83	1,989.53
103	30	3,000.00	30.00	15.00	9.95	15.00	24.95	2,014.48
104	30	3,000.00	30.00	15.00	10.07	15.00	25.07	2,039.55
105	30	3,000.00	30.00	15.00	10.20	15.00	25.20	2,064.75
106	30	3,000.00	30.00	15.00	10.32	15.00	25.32	2,090.07
107	30	3,000.00	30.00	15.00	10.45	15.00	25.45	2,115.52
108	30	3,000.00	30.00	15.00	10.58	15.00	25.58	2,141.10
109	30	3,000.00	30.00	15.00	10.71	15.00	25.71	2,166.81
110	30	3,000.00	30.00	15.00	10.83	15.00	25.83	2,192.64
111	30	3,000.00	30.00	15.00	10.96	15.00	25.96	2,218.60
112	30	3,000.00	30.00	15.00	11.09	15.00	26.09	2,244.69
113	30	3,000.00	30.00	15.00	11.23	15.00	26.23	2,270.92
114	30	3,000.00	30.00	15.00	11.35	15.00	26.35	2,297.27
115	30	3,000.00	30.00	15.00	11.49	15.00	26.49	2,323.76
116	30	3,000.00	30.00	15.00	11.62	15.00	26.62	2,350.38
117	30	3,000.00	30.00	15.00	11.75	15.00	26.75	2,377.13
118	30	3,000.00	30.00	15.00	11.89	15.00	26.89	2,404.02
119	30	3,000.00	30.00	15.00	12.02	15.00	27.02	2,431.04
120	30	3,000.00	30.00	15.00	12.15	15.00	27.15	2,458.19
121	30	3,000.00	30.00	15.00	12.29	15.00	27.29	2,485.48
122	30	3,000.00	30.00	15.00	12.43	15.00	27.43	2,512.91
123	30	3,000.00	30.00	15.00	12.57	15.00	27.57	2,540.48
124	30	3,000.00	30.00	15.00	12.70	15.00	27.70	2,568.18
125	30	3,000.00	30.00	15.00	12.84	15.00	27.84	2,596.02
126	30	3,000.00	30.00	15.00	12.98	15.00	27.98	2,624.00
127	30	3,000.00	30.00	15.00	13.12	15.00	28.12	2,652.12
128	30	3,000.00	30.00	15.00	13.26	15.00	28.26	2,680.38
129	30	3,000.00	30.00	15.00	13.40	15.00	28.40	2,708.78
130	30	3,000.00	30.00	15.00	13.54	15.00	28.54	2,737.32
131	30	3,000.00	30.00	15.00	13.69	15.00	28.69	2,766.01
132	30	3,000.00	30.00	15.00	13.83	15.00	28.83	2,794.85
133	30	3,000.00	30.00	15.00	13.97	15.00	28.97	2,823.81
134	30	3,000.00	30.00	15.00	14.12	15.00	29.12	2,852.93
135	30	3,000.00	30.00	15.00	14.27	15.00	29.27	2,882.20
136	30	3,000.00	30.00	15.00	14.41	15.00	29.41	2,911.61
137	30	3,000.00	30.00	15.00	14.56	15.00	29.56	2,941.17
138	30	3,000.00	30.00	15.00	14.71	15.00	29.71	2,970.88
139	30	3,000	30.00	15.00	14.85	15.00	29.85	3,000.00

(10) Current Cumulative Credit Balance in Share Account	(9) Par Value Of Shares Matured and Retired	(8) Total Credits to Share Account at End of Month	(7) Dividends Credited on Share Account at End of Month	(6) DISTRIBUTION OF MONTHLY PAYMENT: For Purchase of Stock	(5) DISTRIBUTION OF MONTHLY PAYMENT: Interest on Outstanding Principal	(4) Monthly Payment at End of Month	(3) Amount of Principal Outstanding During Month	(2) Shares	(1) Months
$	$	$	$	$	$	$	$3,000.00	30	1
80.07	100.00	15.00	15.00	15.00	15.00	30.00	3,000.00	3	2
45.22	100.00	15.00	15.00	15.00	15.00	30.00	3,000.00	3	3
60.45	100.00	15.00	15.00	15.00	15.00	30.00	3,000.00	3	4
75.75	100.00	15.00	15.00	15.00	15.00	30.00	3,000.00	30	5
91.13	100.00	15.38	15.38	15.00	15.00	30.38	3,000.00	30	6
106.59	100.00	15.46	15.46	15.00	15.00	30.46	3,000.00	30	7
122.12	100.00	15.53	15.53	15.00	15.00	30.53	3,000.00	30	8
137.73	100.00	15.61	15.61	15.00	15.00	30.61	3,000.00	30	9
153.42	100.00	15.69	15.69	15.00	15.00	30.69	3,000.00	30	10
169.19	100.00	15.77	15.77	15.00	15.00	30.77	3,000.00	30	11
185.03	100.00	15.84	15.84	15.00	15.00	30.84	3,000.00	30	12
200.96	100.00	15.93	15.93	15.00	15.00	30.93	3,000.00	30	13
216.96	100.00	16.00	16.00	15.00	15.00	31.00	3,000.00	30	14
233.04	100.00	16.08	16.08	15.00	15.00	31.08	3,000.00	30	15
249.21	100.00	16.17	16.17	15.00	15.00	31.17	3,000.00	30	16
265.46	100.00	16.25	16.25	15.00	15.00	31.25	3,000.00	30	17
281.79	100.00	16.33	16.33	15.00	15.00	31.33	3,000.00	30	18
298.20	100.00	16.41	16.41	15.00	15.00	31.41	3,000.00	30	19
314.69	100.00	16.49	16.49	15.00	15.00	31.49	3,000.00	30	20
331.26	100.00	16.57	16.57	15.00	15.00	31.57	3,000.00	30	21
347.92	100.00	16.65	16.65	15.00	15.00	31.65	3,000.00	30	22
364.66	100.00	16.74	16.74	15.00	15.00	31.74	3,000.00	30	23
381.48	100.00	16.82	16.82	15.00	15.00	31.82	3,000.00	30	24
398.39	100.00	16.91	16.91	15.00	15.00	31.91	3,000.00	30	25
415.38	100.00	16.99	16.99	15.00	15.00	31.99	3,000.00	30	26
432.46	100.00	17.08	17.08	15.00	15.00	32.08	3,000.00	30	27
449.62	100.00	17.16	17.16	15.00	15.00	32.16	3,000.00	30	28
466.87	100.00	17.25	17.25	15.00	15.00	32.25	3,000.00	30	29
484.20	100.00	17.33	17.33	15.00	15.00	32.33	3,000.00	30	30
501.62	100.00	17.42	17.42	15.00	15.00	32.42	3,000.00	30	31
519.13	100.00	17.51	17.51	15.00	15.00	32.51	3,000.00	30	32
536.73	100.00	17.60	17.60	15.00	15.00	32.60	3,000.00	30	33
554.41	100.00	17.68	17.68	15.00	15.00	32.68	3,000.00	30	34
572.18	100.00	17.77	17.77	15.00	15.00	32.77	3,000.00	30	35
590.04	100.00	17.86	17.86	15.00	15.00	32.86	3,000.00	30	36
607.99	100.00	17.95	17.95	15.00	15.00	32.95	3,000.00	30	37
626.03	100.00	18.04	18.04	15.00	15.00	33.04	3,000.00	30	38
644.16	100.00	18.13	18.13	15.00	15.00	33.13	3,000.00	30	39
662.38	100.00	18.22	18.22	15.00	15.00	33.22	3,000.00	30	40
680.69	100.00	18.31	18.31	15.00	15.00	33.31	3,000.00	30	41
699.09	100.00	18.40	18.40	15.00	15.00	33.40	3,000.00	30	42
717.59	100.00	18.50	18.50	15.00	15.00	33.50	3,000.00	30	43
736.18	100.00	18.59	18.59	15.00	15.00	33.59	3,000.00	30	44
754.86	100.00	18.68	18.68	15.00	15.00	33.68	3,000.00	30	45
773.64	100.00	18.78	18.78	15.00	15.00	33.78	3,000.00	30	46
792.51	100.00	18.87	18.87	15.00	15.00	33.87	3,000.00	30	47
811.47	100.00	18.96	18.96	15.00	15.00	33.96	3,000.00	30	48
830.53	100.00	19.06	19.06	15.00	15.00	34.06	3,000.00	30	49
849.68	100.00	19.15	19.15	15.00	15.00	34.15	3,000.00	30	50
868.93	100.00	19.25	19.25	15.00	15.00	34.25	3,000.00	30	51
888.27	100.00	19.34	19.34	15.00	15.00	34.34	3,000.00	30	52
907.71	100.00	19.44	19.44	15.00	15.00	34.44	3,000.00	30	53
927.25	100.00	19.54	19.54	15.00	15.00	34.54	3,000.00	30	54
946.89	100.00	19.64	19.64	15.00	15.00	34.64	3,000.00	30	55
966.62	100.00	19.73	19.73	15.00	15.00	34.73	3,000.00	30	56
986.45	100.00	19.83	19.83	15.00	15.00	34.83	3,000.00	30	57
1,006.39	100.00	19.94	19.94	15.00	15.00	34.94	3,000.00	30	58
1,026.42	100.00	20.03	20.03	15.00	15.00	35.03	3,000.00	30	59
1,046.55	100.00	20.13	20.13	15.00	15.00	35.13	3,000.00	30	60
1,066.78	100.00	20.23	20.23	15.00	15.00	35.23	3,000.00	30	61
1,087.11	100.00	20.33	20.33	15.00	15.00	35.33	3,000.00	30	62
1,107.54	100.00	20.44	20.44	15.00	15.00	35.44	3,000.00	30	63
1,128.07	100.00	20.54	20.54	15.00	15.00	35.54	3,000.00	30	64
1,148.71	100.00	20.64	20.64	15.00	15.00	35.64	3,000.00	30	65
1,169.47	100.00	20.74	20.74	15.00	15.00	35.74	3,000.00	30	66
1,190.32	100.00	20.85	20.85	15.00	15.00	35.85	3,000.00	30	67
1,211.27	100.00	20.95	20.95	15.00	15.00	35.95	3,000.00	30	68
1,232.33	100.00	21.06	21.06	15.00	15.00	36.06	3,000.00	30	69
1,253.49	100.00	21.16	21.16	15.00	15.00	36.16	3,000.00	30	70
1,274.76	100.00	21.27	21.27	15.00	15.00	36.27	3,000.00	30	71
1,296.13	100.00	21.37	21.37	15.00	15.00	36.37	3,000.00	30	72
1,317.61	100.00	21.48	21.48	15.00	15.00	36.48	3,000.00	30	73
1,339.20	100.00	21.59	21.59	15.00	15.00	36.59	3,000.00	30	74
1,360.90	100.00	21.70	21.70	15.00	15.00	36.70	3,000.00	30	75
1,382.70	100.00	21.80	21.80	15.00	15.00	36.80	3,000.00	30	76
1,404.62	100.00	21.92	21.92	15.00	15.00	36.92	3,000.00	30	77
1,426.64	100.00	22.02	22.02	15.00	15.00	37.02	3,000.00	30	78
1,448.77	100.00	22.13	22.13	15.00	15.00	37.13	3,000.00	30	79
1,471.01	100.00	22.24	22.24	15.00	15.00	37.24	3,000.00	30	80
1,493.37	100.00	22.36	22.36	15.00	15.00	37.36	3,000.00	30	81
1,515.84	100.00	22.47	22.47	15.00	15.00	37.47	3,000.00	30	82
1,538.42	100.00	22.58	22.58	15.00	15.00	37.58	3,000.00	30	83
1,561.11	100.00	22.69	22.69	15.00	15.00	37.69	3,000.00	30	84
1,583.91	100.00	22.80	22.80	15.00	15.00	37.80	3,000.00	30	85
1,606.83	100.00	22.92	22.92	15.00	15.00	37.92	3,000.00	30	86
1,629.87	100.00	23.04	23.04	15.00	15.00	38.04	3,000.00	30	87
1,653.02	100.00	23.15	23.15	15.00	15.00	38.15	3,000.00	30	88
1,676.28	100.00	23.26	23.26	15.00	15.00	38.26	3,000.00	30	89
1,699.66	100.00	23.38	23.38	15.00	15.00	38.38	3,000.00	30	90
1,723.16	100.00	23.50	23.50	15.00	15.00	38.50	3,000.00	30	91
1,746.78	100.00	23.62	23.62	15.00	15.00	38.62	3,000.00	30	92
1,770.51	100.00	23.73	23.73	15.00	15.00	38.73	3,000.00	30	93
1,794.37	100.00	23.86	23.86	15.00	15.00	38.86	3,000.00	30	94
1,818.34	100.00	23.97	23.97	15.00	15.00	38.97	3,000.00	30	95
1,842.43	100.00	24.09	24.09	15.00	15.00	39.09	3,000.00	30	96
1,866.64	100.00	24.21	24.21	15.00	15.00	39.21	3,000.00	30	97
1,890.97	100.00	24.33	24.33	15.00	15.00	39.33	3,000.00	30	98
1,915.43	100.00	24.46	24.46	15.00	15.00	39.46	3,000.00	30	99
1,940.01	100.00	24.58	24.58	15.00	15.00	39.58	3,000.00	30	100
1,964.71	100.00	24.70	24.70	15.00	15.00	39.70	3,000.00	30	101
1,989.53	100.00	24.82	24.82	15.00	15.00	39.82	3,000.00	30	102
2,014.48	100.00	24.95	24.95	15.00	15.00	39.95	3,000.00	30	103
2,039.55	100.00	25.07	25.07	15.00	15.00	40.07	3,000.00	30	104
2,064.75	100.00	25.20	25.20	15.00	15.00	40.20	3,000.00	30	105
2,090.07	100.00	25.32	25.32	15.00	15.00	40.32	3,000.00	30	106
2,115.52	100.00	25.45	25.45	15.00	15.00	40.45	3,000.00	30	107
2,141.10	100.00	25.58	25.58	15.00	15.00	40.58	3,000.00	30	108
2,166.81	100.00	25.71	25.71	15.00	15.00	40.71	3,000.00	30	109
2,192.64	100.00	25.83	25.83	15.00	15.00	40.83	3,000.00	30	110
2,218.60	100.00	25.96	25.96	15.00	15.00	40.96	3,000.00	30	111
2,244.69	100.00	26.09	26.09	15.00	15.00	41.09	3,000.00	30	112
2,270.92	100.00	26.23	26.23	15.00	15.00	41.23	3,000.00	30	113
2,297.27	100.00	26.35	26.35	15.00	15.00	41.35	3,000.00	30	114
2,323.76	100.00	26.49	26.49	15.00	15.00	41.49	3,000.00	30	115
2,350.38	100.00	26.62	26.62	15.00	15.00	41.62	3,000.00	30	116
2,377.13	100.00	26.75	26.75	15.00	15.00	41.75	3,000.00	30	117
2,404.02	100.00	26.89	26.89	15.00	15.00	41.89	3,000.00	30	118
2,431.04	100.00	27.02	27.02	15.00	15.00	42.02	3,000.00	30	119
2,458.19	100.00	27.15	27.15	15.00	15.00	42.15	3,000.00	30	120
2,485.48	100.00	27.29	27.29	15.00	15.00	42.29	3,000.00	30	121
2,512.91	100.00	27.43	27.43	15.00	15.00	42.43	3,000.00	30	122
2,540.48	100.00	27.57	27.57	15.00	15.00	42.57	3,000.00	30	123
2,568.18	100.00	27.70	27.70	15.00	15.00	42.70	3,000.00	30	124
2,596.02	100.00	27.84	27.84	15.00	15.00	42.84	3,000.00	30	125
2,624.00	100.00	27.98	27.98	15.00	15.00	42.98	3,000.00	30	126
2,652.12	100.00	28.12	28.12	15.00	15.00	43.12	3,000.00

CONCENTRATION OF CORPORATE CONTROL[1]

W. L. CRUM[2]

IN RECENT years, and especially since the 1928–29 boom, it has been urged that large-scale industry is a menace to economic equilibrium not chiefly because of its supposed capacity for maintaining monopoly prices or for crushing competitors, but because it tends to create cumulative and quasi-permanent distortions in the long-run development of the economic system. It is held, in fact, that large-scale industry destroys or impairs the tendency toward a long-run competitive equilibrium without substituting an effective scheme of general "planning." A subordinate emphasis, not entirely unrelated to this major emphasis, is upon the alleged danger that large-scale enterprises may deprive the owners (stockholders) not only of their rights as individuals but also of their basic function of determining what use shall be made of the earnings and savings accumulated in the business enterprises which they own.

The significance of these ideas, in their bearing upon old-fashioned economic theory, is patent to everyone. Speaking in general terms, and without any attempt to introduce the necessary qualifications, the old-fashioned doctrine assumed that something approaching free competition existed throughout the economic structure. Competitors were thought to be guided in their activities by price, or at least by the relation between price and cost; and the supposed freedom of a particular competitor to enter into and withdraw from a particular type of enterprise, because of the apparent advantage or disadvantage to be gained in view of the prevailing price situation, was thought to explain the working out of a rough long-run equilibrium throughout the system. According to the modern idea of the extent to which

[1] Statistical analysis in support and amplification of remarks at Smith College, February 13, 1935.

[2] Professor of Economics, Harvard University.

control has been concentrated, the old assumption appears no longer valid. It is natural, therefore, that the question as to the extent of concentration in economic control has become one of the very highest importance. The study of this question is expected not only to explain many aspects of current economic experience but also to serve as a guide for public policy.

The term concentration in economic control could obviously be applied with reference to several meanings of control. It is used here with reference to the effects of concentration chiefly upon the control of long-run policy and secondarily upon the control of current management. My present purpose is to set out certain facts which indicate the extent and nature of concentration—the term concentration in ownership of industry seems preferable, for this purpose, to concentration in control—and to suggest interpretations of those facts. The chief data available relate to corporations, and it is therefore not possible to cover satisfactorily enterprises operated as individual firms or partnerships.[3] This obviously means that a bias toward concentration exists in the sample to be studied; for it is precisely in the corporate form of organization that large concentration is generally feasible. The individual enterprise or partnership is likely to be small and its development on a very large scale is so rare as to be almost non-existent. Even the huge Ford enterprise, generally regarded as an individual or family venture, is in fact a corporation; and the Baldwin Locomotive Works, formerly operated by a partnership, took some years ago the corporate form.

DESCRIPTION OF THE DATA

The data used below arise through the administration of the federal corporation income tax. They have the defects, as well as the advantages, of all such data. The chief defects, from the present point of view, are: (1) imperfections in the industrial classification of the tax returns, (2) lack of detail in the classifica-

[3] An interesting study of data derived from the Census, and *not* confined to corporations, was made by Dr. Willard L. Thorp, and its conclusions are broadly consistent with those presented here for corporations. See his, "The Integration of Industrial Operation," *Census Monograph III* (Washington, 1924).

tion according to size, and (3) failure of the accounting items tabulated from tax returns to fit precisely those aspects of corporate affairs which are to be measured. In spite of the defects, each of which is discussed where it enters the following analysis, the data point unmistakably to important broad conclusions about concentration.

Two main bodies of tax data bear upon the subject: one body of data classifies corporations, in each industry, according to the amount of total assets—a roughly satisfactory accounting measure of size—of each particular corporate enterprise. The other body of data segregates the principal items, as customarily tabulated in the tax publications, for the group of corporations which file so-called "consolidated" returns, and most of these corporations are in fact very large.[4] The first body of data is unfortunately available only for 1931 and 1932, years of deep depression, but the second body is available annually for the years 1928–32. The first body of data, which is presented in a form best adapted to the purpose of this study, is considered first in the following analysis. These data appear in Tables 16 and 17 of *Statistics of Income* (pp. 154–59 and 160–77 for 1931, and pp. 160–65 and 166–82 for 1932). Table 16 presents aggregate figures for all reporting corporations combined, without classification by type of industry, and the figures cover a rather detailed list of income-account and balance-sheet items. In Table 17 the aggregates pertain to groups of corporations, each group engaged predominantly in one type of industry, and, although the accounting items covered are much less numerous than those of Table 16, they answer passably well the needs of this analysis.

The comprehensive data of Table 16 have some significance, but the industrially classified data of Table 17 supply the chief evidence. As indicated above, this classification by industry is imperfect: each corporate return is assigned to that type of industry in which its principal activities fall, regardless of the

[4] These data are published in *Statistics of Income*, the official tabulation of tax return data issued annually since 1916 by the Bureau of Internal Revenue. The 1932 issue was published in December, 1934. In that issue the first body of data mentioned above appears in pp. 160–82, and the second body in pp. 33–35.

amount and nature of its other business. One of the most striking examples of this lack of precision in classification appears in the assignment of numerous important steel companies to the metals group of the manufacture division. The mining activities of these corporations are accordingly added into the totals for the metals group, although such activities are very large and would theoretically belong in the mining division. I have discussed the classification difficulty elsewhere, as have other students of the tax statistics.[5] It seems unlikely, however, that this classification difficulty seriously impairs the validity of the main portions of the present analysis, even though there is reason to suspect that the difficulty is most serious for precisely those corporations, the larger corporations, which are chiefly under examination in this analysis. The differences in the indicated degree of concentration as between types of industry are so emphatic that they can almost certainly not be charged to imperfections of classification.

The size classification is according to the amount of total assets. This is not a perfect measure of corporate size, but appears to be the least objectionable of the various accounting items reported in the tax returns. It is ordinarily much more stable than gross sales; and even during depression, when valuations of various assets are subject to change because of fluctuations in market prices or shifts in the point of view of management, it is probably somewhat more stable than gross sales. Any more specialized asset figure, such as the net assets belonging to the stockholders, can be arrived at only uncertainly from the accounts and may be subject to circumstances, such as the form of the capital structure, which the economist wishes to leave out of account in studying size. In any case, the data as published are tabulated in terms of a size classification by total assets. Treasury officials determined upon the total assets as a criterion of size and so upon the boundaries of the size class (as described below) after con-

[5] See my discussions in *Corporate Earning Power* (Stanford University, 1929), chap. ii, and in *Harvard Business Review*, April, 1933, pp. 336–48. Compare also views of J. Franklin Ebersole, Susan S. Burr, and George M. Peterson, in "Income Forecasting by the Use of Statistics of Income Data," *Review of Economic Statistics*, November, 1929, pp. 171–96.

sultation with outside specialists concerning the probable uses to be made of the data.

The size classes selected in the published tables are not wholly satisfactory for such an analysis as that here undertaken. The limits of the class-intervals are shown in Table I, which illustrates the data as published and the operations (described below) applied to them. The width of the class interval becomes pro-

TABLE I

EXAMPLE OF THE DATA AND COMPUTATIONS FOR A SPECIFIC GROUP—METALS MANUFACTURE, IN 1931
(Unit, for assets, $1,000)

Lower Limit of Each Assets-Size Class*	Given Data: Aggregate Total Assets for:		Compiled Results:		
	Income Corporations	No-Income Corporations	Aggregate Assets for All Corporations	Per Cent of Group Total	Cumulative Per Cent
0.....	36,223	112,068	148,291	.71	100.0
50.....	51,266	152,842	204,108	.98	99.3
100.....	138,998	388,939	527,937	2.5	98.3
250.....	170,590	474,303	644,893	3.1	95.8
500.....	197,003	624,645	821,708	3.9	92.7
1,000.....	634,544	1,854,369	2,488,913	12.0	88.8
5,000.....	331,107	959,060	1,290,167	6.2	76.8
10,000.....	1,152,074	2,322,082	3,474,156	16.7	70.6
50,000.....	3,740,121	7,463,197	11,203,318	53.9	53.9
Total for group.....	6,451,986	14,351,505	20,803,491	.....	.....

*The source describes the bottom and top classes as "under 50" and "50,000 and over." In numerous groups data for certain of the top classes are combined into "classes grouped," in order to conceal the identity of particular companies: in such cases, obvious adaptations were made in computing the percentage results.

gressively greater as the amount of total assets increases: for small corporations the class interval is 50 thousand dollars wide, and for very large (but not the largest) corporations it is 40 million dollars wide. The "under 50 thousand" class is not troublesome, for its lower limit may be assumed to be close to zero, but the "over 50 million" class *is* troublesome, for there is great uncertainty as to the location of its upper limit.

For the present purpose, the absence of the stated upper limit to the class of very largest corporations is not particularly un-

fortunate. The real deficiency is in the absence of a finer classification in the upper ranges: it would be desirable to have the four upper intervals broken into narrower sub-intervals, with separate data for each such sub-interval. This arrangement would facilitate a much more precise description of the degree of concentration than is now possible. It will appear below that around 50 per cent of corporate assets in certain industries fall in the top class (over 50 million dollars in assets), and it is clear that some breakdown of this figure would be helpful. It is obvious, however, that the *number* of corporations in the upper intervals is small, and this fact is an important and perhaps adequate reason for not making a finer size classification in the upper ranges.

The analytical operation applied to the data was very simple and consisted in dividing the total reported assets for all corporations, in any one industrial group, into the subtotals belonging to the particular size classes. The results were stated as percentages. For example, in the industrial group, metals manufacture (Table I), total reported assets for 1931 were 20.8 billions; the portion of this total contributed by corporations in the size class, 1 million to 5 millions, was 2.49 billions. Accordingly the percentage of the total for the whole industrial group belonging to this size class was 12.01. The final arithmetical operation was to cumulate the percentages from the top downward. The main conclusions about concentration can be drawn from these cumulative figures. If, for example, the percentage of the total which is contributed by corporations having over 50 millions of assets each is above 50 (as it is in numerous cases, including that shown in Table I), it is obvious that the great bulk of corporate property in the particular case (industrial group) is owned by very large companies. If, on the other hand, it is necessary to reach down in the scale of size in order to get a cumulated percentage as great as 50, it is clear that in such case the extent of concentration is distinctly smaller.

This type of analysis was carried out separately for 1931 and 1932 for each group of specified industries in manufacture, for each major industrial division (one of which is all manufacturing combined), and for the composite of all corporations. It is em-

phatically clear from the results (see Table II) that the differences between 1931 and 1932 are very slight in every case, and the dis-

TABLE II

CUMULATIVE PERCENTAGE DISTRIBUTION, BY CLASSES DEFINED IN TERMS OF SIZE OF TOTAL ASSETS, FOR EACH INDUSTRIAL DIVISION AND MANUFACTURE GROUP AND FOR TWO GENERAL LISTS*

LOWER LIMIT OF ASSETS-SIZE CLASS†	ALL DIVISIONS COMBINED		ALL DIVISIONS, EXCEPT FINANCE AND PUBLIC UTILITIES		MANUFACTURE		TRADE		MINING		SERVICE		CONSTRUCTION	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
50	98.9	98.6	97.4	97.0	98.8	98.7	92.0	90.6	99.2	99.2	95.3	95.9	92.9	92.0
100	97.4	97.1	94.5	94.1	97.3	97.2	84.3	82.7	98.2	98.0	91.1	92.3	86.1	85.3
250	94.0	93.8	88.7	88.3	93.8	93.7	71.4	69.9	95.3	94.9	82.9	84.2	72.8	72.7
500	90.3	90.2	83.1	82.8	89.9	89.8	61.1	59.8	91.6	91.2	75.7	76.4	62.2	61.7
1,000	86.1	85.8	76.7	76.5	85.0	85.1	51.5	50.5	86.0	85.8	67.3	66.3	50.0	50.8
5,000	72.9	73.5	60.7	60.2	71.3	71.4	33.7	33.8	66.5	66.7	45.8	40.8	29.9	29.7
10,000	66.8	67.5	53.8	52.7	64.6	64.5	27.5	26.7	57.1	57.1	38.4	31.5	24.4	.....
50,000	52.2	53.3	37.2	36.2	46.4	46.3	15.4	15.4	36.4	35.8	.....	.....	.....	.....

	AGRICULTURE		FINANCE		PUBLIC UTILITIES		METALS		CHEMICALS		FOOD		TEXTILES	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
50	96.6	96.5	99.4	99.3	99.7	99.8	99.3	99.2	99.7	99.6	98.3	98.0	97.5	95.7
100	92.0	91.9	98.4	98.2	99.5	99.6	98.3	98.2	99.2	99.1	96.1	95.6	94.7	92.0
250	80.7	81.0	95.3	95.0	99.1	99.2	95.8	95.7	98.1	97.9	91.2	90.6	88.5	85.6
500	69.4	69.5	91.3	91.1	98.7	98.7	92.7	92.7	96.8	96.6	86.3	85.7	80.9	79.2
1,000	56.0	57.1	85.9	86.0	98.1	98.1	88.8	89.0	95.1	94.9	80.9	80.5	70.7	71.7
5,000	.....	28.3	69.6	70.8	95.7	95.6	76.8	77.2	90.2	89.7	67.4	66.7	41.5	55.7
10,000	.....	.....	61.9	63.6	93.6	93.3	70.6	71.1	87.6	86.3	60.8	59.2	29.9	46.3
50,000	.....	.....	45.6	47.8	84.8	84.6	53.9	54.3	76.1	75.5	38.0	34.8	.....	.....

	PRINTING		FOREST PRODUCTS		PAPER		STONE		RUBBER		TOBACCO		LEATHER	
	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932	1931	1932
0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
50	96.1	95.7	98.4	98.1	99.4	99.3	98.5	98.2	99.7	98.2	99.8	99.8	97.9	97.4
100	92.4	92.0	95.7	95.3	98.5	98.4	96.2	95.7	99.3	95.7	99.5	99.4	95.2	94.4
250	85.8	85.6	88.0	87.8	96.0	95.7	90.5	89.9	98.2	89.9	98.7	98.7	88.0	86.8
500	79.4	79.2	79.5	79.6	92.6	92.6	84.2	83.4	96.8	83.4	98.0	97.9	80.2	78.2
1,000	71.4	71.7	69.1	69.6	87.5	87.6	76.8	75.9	94.8	75.9	97.2	97.1	71.3	68.4
5,000	54.6	55.7	41.3	.....	69.4	69.3	55.4	53.9	87.1	53.9	91.4	90.5	45.7	43.3
10,000	45.1	46.3	29.2	.....	60.8	59.7	42.9	43.6	.....	43.6	.....	.....	32.8	28.1
50,000	.....	.....	11.4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

* A miscellaneous "division" and a miscellaneous manufacture "group" are included, but not reported separately. Divisions (except finance and public utilities), and groups, are arranged in order of their importance.

† Unit: $1,000.

cussion which follows will accordingly be based upon the 1931 figures. Before leaving this point, notice is taken of the fact that

both of these years were in the depths of the great industrial depression, which had been marked not only by continued low earning power but also by frequent large readjustments in the capital structure and in the accounting valuations of particular corporations. In view of all these changes it is surprising that the results for 1932 are so closely similar to those of 1931. Apart from this, it is important to bear in mind that the results for either of these years may not be typical of so-called normal economic conditions.

INDICATIONS OF THE RESULTS

Table II shows the cumulated percentage figures for all corporations and for each division and group, for each year. In 1931, 52.2 per cent of the total reported assets of all corporations was held by corporations having at least 50 millions of assets each, and 86.1 per cent was held by corporations of at least 1 million of assets each. Putting it the other way round, only 47.8 per cent was held by corporations having less than 50 millions of assets each, and only 13.9 per cent by corporations having less than 1 million each. It is obvious at once that these figures indicate a remarkable degree of concentration. The major portion of corporate property was held by large corporations.

No such sweeping generalization can safely be drawn, however, merely from the figures for industrial divisions combined. Careful examination of the corresponding results for the several industrial divisions and manufacture groups shows diversity in the indicated degree of concentration. The most striking discrepancy —one which could be anticipated on a priori grounds—appears in the division, transportation and other public utilities. For this division, 84.8 per cent of total assets was held by companies having over 50 millions each, and 98.1 per cent by companies having over 1 million each. In view of the well-known reasons for anticipating a high degree of concentration in enterprises of the public utility type, it has seemed wise to exclude this division from the complete list of all corporations in arriving at a standard of reference for testing the relative concentration in other divisions. For somewhat different reasons, it has seemed wise also to exclude the finance division, which has an indicated degree of concentra-

tion similar to all divisions combined as reported above.[6] With these two exclusions (which cut the grand total of assets from 296 billions to 103 billions in 1931) the indicated concentration for "all" groups can be summarized by saying that 37.2 per cent was held by companies having over 50 millions of assets each and 76.7 per cent by companies having over 1 million each. These figures will now be taken as a basis of comparison in the case of each division other than finance and public utilities.

The most important such division is manufacture, which shows a degree of concentration notably greater than the standard (46.4 per cent in the over 50 millions class, 85 per cent in the over 1 million class). The next most important division is trade, wherein the degree of concentration is abnormally low (15.4 per cent in the over 50 millions class and 51.5 per cent in the over 1 million class). Next in order is mining, for which the degree of concentration is only moderately less than in manufacture. From the point of view of interpretation this is fortunate, because the so-called mining division is one in which the classification difficulties mentioned above are peculiarly serious. A very large share of actual mining activities conducted by corporations is in fact conducted by integrated concerns which are classified in these statistics under manufacture. The fact that the indicated concentration in mining is about the same as in manufacture enables us to attach a significance to the mining figures which would not otherwise be possible. The other divisions—service, construction, and agriculture—are all very small portions of the grand total; in each, concentration is below standard; and in construction it is very much below standard, not very different from that in trade.

Corresponding comparisons can be made for the various groups into which the statistics for the manufacture division are subclassified, the standard of comparison here being the indicated concentration for the manufacture division as a whole (46.4 per cent over 50 millions, 85 per cent over 1 million). The highest degree of concentration is shown for tobacco, which however con-

[6] These reasons are in the main parallel to those given by A. A. Berle, Jr., and G. C. Means in *The Modern Corporation and Private Property* (New York, 1932), chap. iii.

stitutes only a small fraction of the entire division. Almost as great concentration appears in chemicals and in rubber, and even for metals and for paper the degree of concentration is somewhat greater than the standard. For the remaining groups, indicated concentration is below standard. These groups, stated in the order of their concentration, are: food, stone, printing, leather, and textiles. These findings, which show highest concentration in such industries as tobacco and chemicals and lowest in such industries as leather and textiles, are in accord with generally accepted views of the existing situation.

The above examination of the data shows a generally high degree of concentration, and a wide diversity in the extent of concentration as among major industrial divisions and even among different groups within the manufacture division. It may fairly be assumed that if the data were presented in a form yielding further subclassification according to specified industrial activity, within the groups of the manufacture division and within the other divisions, similar and perhaps even greater diversities would be disclosed. The essential point to be emphasized is that corporate concentration is not necessarily a characteristic of all industries but is peculiar to certain kinds of industry. This finding is largely in accord with the conclusions of Dr. Thorp's study of a quite different body of data available in the Census.

A somewhat different view—essentially a reverse view—of the distribution of corporations by size of total assets is afforded by the data on number of corporations rather than amount of total assets in each size class. These data, as compiled from the *Statistics of Income* tabulations used in the foregoing analysis, appear in Table III. The calculation of cumulative percentages here does not appear helpful. In no group or division except public utilities, is the number of corporations in the 50 million-and-over class as great as 1 per cent of the total number in such group or division.

A helpful percentage summary of these figures can, however, be based upon the boundaries 50 thousand dollars and 1 million dollars. Specifically, percentages were calculated to show, for each group and division, the portion of the total number of corporations having total assets (1) under 50 thousand dollars each, and

TABLE III

TABLE III

Distribution of Number of Corporations, in Each Industrial Division and Manufacture Group, According to Amount of Total Assets for Each Corporation‡

Size Classes*	Agriculture	Mining	Manufacture	Construction	Trade	Public Utilities	Service	Finance	All Divisions† A	All Divisions† B	Foods	Tobacco	Textiles	Leather	Rubber	Forest Products	Paper	Printing	Chemicals	Stone	Metals
1931																					
0	3,201	3,223	35,986	9,349	69,676	9,500	18,254	32,140	182,447	140,807	5,387	126	6,493	837	191	2,052	573	5,816	2,673	1,462	6,934
50	1,367	1,472	13,089	2,391	19,466	2,069	3,881	17,201	61,144	41,874	2,233	46	1,938	337	69	1,080	303	1,607	947	705	2,812
100	1,535	1,831	13,940	2,131	15,026	1,882	3,443	23,429	63,438	38,117	2,235	59	1,946	406	87	1,309	375	1,295	1,067	767	3,283
250	693	1,049	7,105	754	5,300	904	1,367	13,802	31,052	16,346	1,016	22	1,068	199	50	696	229	559	524	386	1,823
500	414	791	4,452	434	2,483	615	795	9,208	19,335	9,422	566	15	728	114	34	435	173	343	359	234	1,177
1,000	323	936	4,215	251	1,645	800	681	9,453	18,345	8,092	475	30	700	114	47	397	206	258	348	218	1,177
5,000	25	139	618	21	152	210	72	1,351	2,588	1,027	68	6	86	17	9	49	31	42	58	40	188
10,000	8	110	562	16	113	279	45	984	2,117	854	80	9	68	11	9	26	38	33	79	31	158
50,000	1	25	139	3	25	198	7	234	632	200	23	5	2	1	4	3	6	2	35	4	52
Total	7,567	9,576	80,106	15,350	113,886	16,457	28,545	107,892	381,088	256,739	12,082	318	13,029	2,036	500	6,137	1,934	9,955	6,090	3,847	17,604
% under 50‡	42.35	33.7	44.9	60.9	61.2	57.7	64.0	29.8	47.9	54.9	44.6	39.6	84.6	41.1	38.2	33.3	29.6	58.4	44.0	38.0	39.4
% over 1,000	4.72	12.64	6.91	1.895	1.698	9.03	2.82	11.13	6.21	3.96	5.34	15.72	6.57	7.02	13.80	7.71	14.52	3.36	8.54	7.62	8.95
1932																					
0	3,387	3,830	40,901	10,303	80,204	10,665	21,511	34,807	206,477	161,005	6,460	146	7,477	1,042	207	2,367	653	6,673	3,176	1,619	7,622
50	1,372	1,524	12,539	2,048	17,628	1,992	4,316	16,771	58,320	39,557	2,258	52	1,820	335	65	1,052	304	1,538	930	692	2,611
100	1,504	1,842	13,021	1,744	13,136	1,840	4,343	21,950	59,500	35,710	2,164	53	1,787	383	86	1,289	390	1,212	1,042	725	3,018
250	712	986	6,506	677	4,584	863	1,882	12,163	28,422	15,306	960	23	960	109	53	627	206	538	491	360	1,625
500	382	723	4,043	337	2,138	647	1,229	8,087	17,590	8,856	516	14	635	112	30	390	169	313	345	212	1,028
1,000	319	857	3,887	236	1,384	815	1,081	8,096	16,705	7,794	454	31	642	96	49	345	209	241	330	200	1,068
5,000	31	134	587	20	159	232	121	1,157	2,442	1,053	73	6	76	17	7	49	33	42	66	30	167
10,000	8	103	512	16	91	278	60	878	1,947	791	81	9	63	7	8	25	35	30	62	30	142
50,000	1	21	117	1	22	215	9	232	618	171	19	4	3	1	4	3	7	2	30	3	41
Total	7,716	10,020	82,183	15,382	119,346	17,547	34,552	104,141	392,021	270,333	12,985	336	13,462	2,112	509	6,147	2,006	10,589	6,472	3,870	17,322
% under 50	43.9	38.3	49.7	66.9	67.4	60.8	62.4	33.4	37.4	59.6	49.7	43.2	57.6	47.5	40.7	38.5	32.6	63.4	49.4	41.5	43.9
% over 1,000	4.01	11.14	6.21	1.774	1.388	8.78	3.66	9.94	7.32	2.86	4.83	14.89	4.89	5.52	13.36	6.86	14.15	3.02	7.56	6.71	8.72

* Lower limit of interval, unit $1,000.

† Column A based on *all* data in the official source. Column B excludes public utilities and finance divisions.

‡ All data in body of table are numbers of corporations, except rows marked %. Those rows express percentages of total number. A miscellaneous division, and a miscellaneous group in manufacture, are omitted from the table, but not from the totals.

(2) over 1 million dollars each. These percentages are entered at the foot of each column in the 1931 block and 1932 block of Table III.

Whereas the earlier analysis (Table II) showed the great bulk of total assets for nearly every division and group in the class above 50 million dollars, these percentages of Table III show a very large portion of the number of corporations in the class under 50 thousand dollars. This result was to be expected, for the present summary presents largely a reverse view of that given in Table II. Those percentages of Table III which show the portion of the total number of corporations in the classes above one million dollars are significant, in a limited way, of the degree of concentration. Thus, the divisions mining, public utilities, and finance, and the groups tobacco, rubber, and paper appear to have high concentration. Agriculture, construction, and service are the divisions, and foods and printing are the groups, showing low concentration. These detailed results do not check precisely with the indications of Table II, but the two analyses are in the main consistent.

THE CONSOLIDATED RETURNS

Although it is impossible to extend the above analysis to the years before 1931, some basis for projecting the conclusions into earlier years is found in the second body of statistics mentioned above. These statistics pertaining to consolidated corporations are significant for the present purpose because most of the consolidated enterprises reporting to the federal tax authorities are very large.[7] Unfortunately the consolidated corporation data are not in a form permitting the kind of analysis used above. It can be shown definitely, however, that a predominant number of the consolidated returns fall in the large-corporation group. This conclusion unfortunately must rest mainly upon a very poor measure of the size of enterprise, namely the amount of statutory net income. The form in which the data are presented precludes the classification of the consolidated returns on any other criterion of size than this. Comparison of the amount of net income reported

[7] Cf. the discussion in W. L. Crum, "Large-Scale Enterprise in the Light of Income Tax Returns," *Quarterly Journal of Economics*, XLVII (May, 1933), pp. 414–48.

by consolidated corporations with the amount reported by all corporations shows unmistakably that the consolidated corporation is typically large.[8] Over 80 per cent of the net income in the largest class—corporations having net incomes over 5 millions each—was reported in the years studied, by consolidated returns. These calculations refer to *income* corporations only, but the data clearly show a tendency for the consolidated enterprises among the *deficit* corporations to have very large deficits. It is of course not possible to infer that the observed distribution, in terms of size of net income, prevails in every line of industry, but that something of the sort prevails in every important line seems highly probable. It is difficult to see, in other words, that consolidated corporations can on the average be other than very large in any major line of industry.

With this condition in mind, aggregate figures for gross income as reported by all corporations and by consolidated corporations have been studied for each of the five years, 1928–32, for each industrial division and for each manufacture group. The analytical operation is again very simple; the corporate gross income of the consolidated group is stated merely as a percentage of the total.

On this basis the percentages for all corporations combined run distinctly above 40 in the first four years and only slightly under 40 in 1932 (Table IV). This means that roughly 40 per cent of all corporate gross business is done by a very small number of consolidated corporations, most of which are unmistakably large. Again it has seemed desirable to exclude certain divisions in deriving a more typical figure to be used as a standard of comparison, and in this case the service division as well as the finance and public utilities divisions are excluded. On this basis "all" corporations show percentages running slightly over 40 in each of the first four years and considerably under 40 in 1932.

Comparison of each of the five individual divisions with the standard shows that the percentage runs very much higher than the standard in manufacture and mining, and lower in agriculture, still lower in trade, and very much lower in construction. Correspondingly, comparison of the percentages for the individual manufacture groups with those for the entire manufacture divi-

[8] Crum, *loc. cit.*, p. 431, Chart 7.

sion show that rubber, chemicals, metals, and foods are high; whereas paper, leather, stone, printing, lumber, and textiles are low. In making these summary statements it is well to notice that the indicated relations prevail generally in each of the first four

TABLE IV

PERCENTAGE OF AGGREGATE CORPORATE GROSS INCOME WHICH WAS REPORTED ON CONSOLIDATED RETURNS, FOR EACH YEAR

	1928	1929	1930	1931	1932
All divisions	44.4	45.1	47.6	46.7	39.6
All, except finance, public utilities, service	40.1	43.6	46.2	44.3	37.4
Agriculture	30.6	33.4	30.3	33.0	31.1
Mining	54.1	57.1	58.3	60.8	56.1
Manufacturing	52.7	57.1	60.0	56.7	49.2
Food products*	59.4	62.1	63.3	61.7	48.2
Textiles	20.7	23.1	23.4	23.4	16.0
Leather	38.7	43.2	43.6	44.1	24.0
Rubber	79.7	81.7	84.2	82.6	82.8
Lumber	26.8	26.7	28.8	29.8	26.2
Paper	40.1	42.0	43.2	36.0	33.9
Printing	32.7	33.2	33.4	34.5	28.3
Chemicals	69.3	78.7	85.2	79.2	76.6
Stone, etc.	35.0	40.0	42.5	45.5	31.8
Metals	62.7	67.3	66.5	65.5	57.9
Construction	10.3	14.6	15.3	15.0	15.6
Public utilities†	80.7	83.0	84.1	85.3	68.9
Trade	21.3	22.0	25.7	27.6	21.5
Service	25.9	27.8	31.6	34.3	27.9
Finance	45.1	20.7	19.8	21.7	19.0

* Includes tobacco.

† Includes transportation.

years but are somewhat different in 1932. A possible reason for 1932 showing different results is that punitive taxation was being imposed upon consolidated returns by the Congress, and this possibly resulted in the curtailment of reporting on the consolidated basis.[9]

[9] Internal revenue laws and regulations had provided for the filing of consolidated returns by closely affiliated groups of corporations as early as 1918, but the first data tabulated and published were those for 1928. (There are about 9,000 such returns, out of a total of close to a half million corporate tax returns.) Changes in the revenue laws have made slight changes in the definition of the closeness of affiliation necessary before a consolidated return might be filed. These changes were of little significance, compared with the supplementary tax imposed in 1932 and the prohibition of such filing enacted in 1934.

Although the data do not warrant assuming that all consolidations are large or that all large corporations are consolidated, it is roughly appropriate to use the percentage figures just discussed as indications of the degree of concentration. They are admittedly less pertinent than the figures presented in Table II and it is clear that some of the specific indications for particular groups or divisions differ from those of Table II. These figures are, nevertheless, a sufficiently good measure of concentration to disclose that the type of diversity discovered for 1931 and 1932 prevailed in substantially the same form in 1930 and in the years of prosperity, 1928 and 1929.

CONCLUSION

The foregoing statistical results, particularly those for 1931 and 1932, show considerable evidence of a very large degree of concentration in the control of corporate assets for industry as a whole, and for the major branches of industry. Even in those industrial divisions, trade and construction, where concentration is least evident, over one-half of the total assets were held by companies having at least one million dollars of assets each and even in that manufacture group, textiles, where evidences of concentration were less than in other branches of manufacture, over 70 per cent of the total assets were held by companies having at least one million dollars of assets each. It is possible that a finer subclassification might reveal some cases in which concentration was smaller but it is highly doubtful if any such subclassification would show considerably higher concentration than is actually revealed by the huge public utility division. The 1928–32 data broadly sustain the results for 1931 and 1932. They do not, however, yield any clear indication of the trend, and it is impossible to ascertain on the basis of this analysis whether such concentration as exists is marked by a tendency to still further concentration. Enough has been shown however to warrant the statement that, even with the degree of concentration already attained, a very large part of American industry is subject to control, as respects current operations and long-run planning, by the executives of a very small number of great corporations.

CREDIT UNIONS

LEWIS A. FROMAN[1]

I

THE purpose of this paper will be to give a limited amount of descriptive material covering the extent, the organization, and the operation of the credit union (Part I), and to appraise its usefulness (Part II). Some speculation as to the probable position which the credit union will occupy in the small-loan finance field in the future will complete the discussion. Very extensive detailed descriptions of the organization and operation of the credit union have appeared elsewhere.[2] Only a brief survey, together with some new developments, will be included here.

The credit union is a relatively new organization among the personal finance agencies in the United States. Similar associations, usually referred to as "people's banks," have long been used in European countries, notably Germany and Italy. The origin

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[2] Evans Clark, *Financing the Consumer;* Bergengren, *Coöperative Banking—A Credit Union Book;* Neifeld, *The Personal Finance Business;* Ham and Robinson, revised by Nugent, *A Credit Union Primer;* Industrial Relations Section, Princeton University, *The Use of Credit Unions in Company Programs for Employee Savings and Investment.* Various pamphlets prepared by the Credit Union National Extension Bureau, and the Farm Credit Administration. The United States Bureau of Labor Statistics has made four studies of credit union societies in the United States. The results of the first three of these studies were published in 1920, 1925, and 1929 as Bulletins 313, 437, and 531. The results of the fourth survey were published in the *Monthly Labor Review* for September, 1934. Comprehensive statistics, however, covering the operation of all credit unions in the United States are very difficult to obtain.

In spite of this long list of reference material, adequate statistics on credit unions are not available. Much of the information has been collected by "selling bodies," that is, organizations which are interested in developing a wider use of credit unions. For this reason, their information in some cases is biased, and the data contained here are subject to this criticism. Until some independent organization makes a comprehensive study of credit unions, we will have to depend, as I have in this article, upon the information available. Such a study will no doubt be forthcoming if credit unions continue to grow at their present rate.

of the credit union has been traced to the Raiffeisen and Schulze-Delitzsch systems of co-operative credit which began operations in Germany in 1849. Credit unions are co-operative organizations, and the resistance of American individualism to co-operative movements has been outstanding in this field, as well as in other fields, such as consumer's co-operatives, which have been used a great deal in European countries. Only a very limited number of consumer's co-operatives has ever been organized in the United States. The first credit union in the United States was chartered in the state of Massachusetts in 1910. The Massachusetts legislature had passed a law providing for such organizations the preceding year. At the present time some forty states have similar laws, and until recently, all the charters for credit unions were granted by the several states. By 1915 only sixty-four credit unions had been organized in four states—Massachusetts, New York, North Carolina, and Rhode Island. By 1925 this number had increased to 419, but even then these organizations were not of outstanding importance in the small-loan field. At the close of 1929, 974 credit unions were known to be in existence.

The growth in the number of credit unions in the United States since 1929, however, has been even more rapid than during the 1925 to 1929 period. This has been especially true in the last year. It is estimated that, at the present time, credit unions are being formed at the rate of 100 per month, and that there are about 3,000 of them in operation.[3] Since 1929, therefore, the number of credit unions in operation in the United States has more than trebled. This increase becomes all the more important when thought of in terms of a depression period which has not been at all conducive to expansion in most fields.

The beginning of the credit union in the United States may be traced to the efforts of Mr. Edward A. Filene, a Boston merchant and philanthropist. In connection with his trip around the world in 1908, Mr. Filene studied a number of European co-operative

[3] Estimate of the Credit Union National Association as of March 1, 1935. Seventy-one federally chartered credit unions in addition to those chartered by the states were formed during the month of March, 1935.

credit organizations, especially those in Germany and Italy. Upon his return to the United States he was able to interest Mr. Pierre Jay, who was at that time commissioner of banking of Massachusetts, in making it possible for similar agencies to be set up in this country. Together they drafted the first general credit union law, which was passed by the state of Massachusetts in 1909. Mr. Filene has likewise financed the Credit Union National Extension Bureau, which was formed for the purpose of conducting a nation-wide campaign to win the adoption of enabling acts in the various states, and to furnish information and aid to existing credit unions. The Russell Sage Foundation was instrumental in obtaining the passage of the credit union law of New York State in 1913.

In June, 1934, Congress passed a law providing for the federal chartering of credit unions. The Farm Credit Administration[4] was asked to supervise the federally chartered credit unions, and the first co-operative society to take out a federal charter began operations on October 1, 1934. Three hundred and four federal credit unions had been chartered by May 1, 1935. The present rate of increase in the number of both federal and state credit unions, in the United States, therefore, would seem to indicate that these organizations may occupy an important place in the personal finance field in the near future.

PURPOSE

There are a number of purposes of credit unions, but the two outstanding ones seem to be: (1) to encourage thrift among the members, and (2) to provide credit for the members at reasonable rates. A third purpose which is perhaps equally important but much more difficult to evaluate is the business training which results from membership in a credit union. These functions have been stated more fully as follows:[5]

1. It encourages thrift by providing a safe, convenient, and attractive medium for the investment of the savings of its members through the purchase of shares and the making of savings deposits.

[4] This was probably a matter of convenience because credit unions are of very little importance among farm groups. A summary of the Federal Credit Union Act will be given at a later point in the discussion.

[5] Ham, Robinson, and Nugent, *A Credit Union Primer*, page 17.

2. It promotes industry by enabling its members to borrow for productive and other beneficial purposes.

3. It eliminates usury by providing its members, when in urgent need, with a source of credit at reasonable cost, which they could not otherwise obtain.

4. It trains its members in business methods and self-government, endows them with a sense of social responsibility, and educates them to a full realization of the value of co-operation.

Self-government is carried out to the fullest extent. Each member is allowed one vote regardless of the number of shares which he holds. The officers are elected from the group and usually serve without pay. A loan committee passes upon all applications for loans. It is hoped that the experience gained by the members will materially aid them in understanding the fundamentals of banking. Each member must be a shareholder, and in many cases he likewise becomes a borrower. He is, therefore, able to obtain the combined points of view of the investor and the borrower.

ORGANIZATION

The membership of the credit union is usually made up of persons closely associated in their daily lives. This association may result from working for the same employer, from being members of the same lodge, parish, or labor union. A common interest resulting from pursuing the same or similar types of work seems to have been most important in the formation of credit unions. It is this characteristic of the membership of credit unions which makes such organizations stand apart from other agencies of mass finance. Most state laws require that the members of a credit union have some common association.

The formation of credit unions among civil-service employee groups has been outstanding. In the industrial field, at the close of 1934 there were nearly 100 credit unions which had been formed by the employees of Armour and Company alone. A survey covering over one thousand of the credit unions which were in existence during 1933 shows the importance of specific company and public employee groups.[6] Nearly 80 per cent of the credit unions included in this survey limited their membership to the employees of specific companies or to federal, state, county, or municipal employees.

[6] *Monthly Labor Review*, September, 1934, pp. 557–58.

In order to become a member of a credit union, it is necessary to purchase shares of the union. These shares are usually in $5.00 or $10.00 denominations, and it is not necessary for a member to purchase more than one share. In a few cases shares are for lesser amounts, but all share purchases may be paid for on a weekly basis, for as little as 10 cents a week. Every borrower must be a member of the union. In addition to the funds raised by the sale of shares to members, some credit unions accept deposits. A

TABLE I

CREDIT UNION MEMBERSHIP

Membership Limited to	Number of Credit Unions	Percentage of Total
Employees of specified companies	470	46.3
Public employees	324	31.9
Employees of specified organizations	43	4.2
Members of labor organizations	37	3.7
Members of religious groups	36	3.5
Specified locality groups	34	3.3
Other groups	25	2.5
No restriction on membership	47	4.6
Total	1,016	100.0

survey of more than 1,600 credit unions which were operating during 1933 shows that slightly less than one-quarter of them were accepting deposits.[7] The total volume of funds received from these two sources determines the normal[8] lending power of the association. The volume of deposits, however, is considerably less than the amount of share capital. On the average, deposits of the unions which permit them amount to only about 25 per cent of the share capital[9] of all credit unions.

[7] *Ibid.*, p. 562.

[8] "Normal" because in addition, the credit union itself may borrow from a commercial bank, and in turn, loan the funds so obtained to its members.

[9] This survey covered four credit unions which were operating in the state of New Hampshire. Three of these accepted deposits, and the deposits of the three unions were approximately fifteen times larger than the share capital of all four associations. This case is cited to illustrate an exception from the average condition.

At the close of 1933, the Bureau of Labor Statistics estimated that there were approximately 306,000 members of 1,673 credit unions known to be in existence in the United States. This makes an average membership of 215 persons. Various other estimates place the average membership between 200 and 250 per society. The Credit Union National Association estimated that the 3,000 credit unions in existence in March, 1935, had approximately 650,000 members. This would mean an average membership of 217.

The average share capital, that is, the funds received as the result of purchases of shares by members, was approximately $14,000 per union, as of the close of 1934.[10] The average paid-in share capital per member averages a little more than $60.[11]

Credit unions usually do not have any physical properties of their own, for it is not necessary to have more than a small office for administrative purposes. Their funds are usually kept in commercial or savings banks. The expenses of operation, therefore, are very low. The employer, or the organization responsible for the common interest of the group usually donates the office space, and the only items of expense are office supplies, stationery, taxes, fees, etc. For the larger unions, of course, it is necessary to employ secretarial and bookkeeping assistants. A report from 279 credit unions covering operations for the year 1933 showed that expenses averaged only 2.21 per cent of all loans granted. These expenses were divided as shown in Table II.[12]

In order to provide for contingencies, most credit unions set aside a "guaranty fund." This is taken from earnings before the payment of dividends. The guaranty fund, usually required by law, is in the nature of a surplus and is for the protection of the depositor and shareholder. On the average it amounted to about 10 per cent of the share capital, and about 40 per cent of the deposits of the credit unions operating during 1933.

[10] Survey of 981 credit unions made by the Farm Credit Administration. This result likewise was obtained by the Bureau of Labor Statistics in its 1933 survey of 1,644 credit unions.

[11] *Monthly Labor Review*, September, 1934, p. 561.

[12] *Ibid.*, p. 567.

OPERATION

The business carried on by a credit union is extremely simple. It secures funds almost exclusively from its shareholders and depositors, and in turn loans these funds to various members. In addition to the funds furnished by the members, it is possible for credit unions to borrow from commercial banks. The Farm Credit Administration estimates that approximately one-fifth of the credit unions borrowed money during the last three years. Most

TABLE II

OPERATING EXPENSES OF 279 CREDIT UNIONS DURING 1933

Item	Amount Spent for Specified Item	Per Cent of Loans Granted
Salaries	$142,311.05	1.33
Stationery	24,632.38	.23
Rent, heat, light, and power	10,980.60	.10
Insurance, taxes, and fees for auditing	12,402.79	.12
Miscellaneous	45,703.58	.43
Bad debts	106.90	*
	$236,136.67	2.21

* Less than 1/100 of 1 per cent.

of these loans were necessary to satisfy the needs of the borrowing members. In some cases it has been necessary for the credit unions to postpone applications for loans until funds were available, and in a few cases flat refusals were made for this same reason. The loan turnover of credit unions is high due to the short duration of their loans, and likewise due to the partial repayments of the loans which usually begin immediately after the loan is granted. The Farm Credit Administration has attempted to ascertain the need for a re-discounting institution for credit unions. Replies from nearly 1,000 credit union officers indicate that most of them, approximately 67 per cent, do not feel that re-discounting facilities are needed. Most credit unions, however, favor the inter-lending of funds between various societies.[13]

[13] *Credit Union Survey*, Farm Credit Administration, March 15, 1935.

A large proportion of the loans made to members is without any security. Collateral loans are rare. When security is needed, it usually consists of the signatures of two co-makers who likewise must be members of the association. Some of the larger loans are secured by real estate mortgages. The Credit Union Bureau estimated the total number of credit union loans secured by each type of collateral in 1930 as shown in Table III.[14]

The amount of the loan is usually small. Almost all state laws have maximum limitations on loans which credit unions may

TABLE III

TYPES OF LOANS

	Per Cent of Total Number
Unindorsed promissory notes	50
Co-maker notes	30
Mortgages	15
Wage assignments	5

grant. The maximum limit of $500 set by the Louisiana and New Jersey laws is the lowest of all the states. The laws of other states are more liberal, ranging up to $8,000 for mortgage loans in Massachusetts. The average size of the loans made by over one thousand credit unions in 1934 was $96.[15] The average loan made by 1,603 associations during 1933 was $138.[16] The difficulty of stating an average loan figure is that there are usually a few large loans which tend to increase the general average. It is estimated that most loans, except those made on real estate, are for amounts between $50 and $150.

The number of loans made by over one thousand societies during 1934 was equal to 90 per cent of the members. During 1933, the number of loans made by 1,603 credit unions equaled approximately 70 per cent of the total number of members. This

[14] Evans Clark, *Financing the Consumer*, p. 96. Individual credit union practices vary widely on this point.

[15] *Credit Union Survey*, Farm Credit Administration, March 15, 1935.

[16] *Monthly Labor Review* for September, 1934, p. 565.

gives some indication of the number of members who borrow from the unions. The fact that a member may obtain more than one loan within the year from his union gives an upward bias to these figures if used to show the percentage of the total number of members who borrow each year.

Most credit union charters provide that loans may be made for productive and provident purposes. This, of course, may mean almost anything. An analysis of 4,000 loans made by eight credit unions with a total membership of approximately 14,000 was made by the Bureau of Labor Statistics in 1927. Two of these unions were open to general membership, and two others to the employees of city governments. Four were composed of employees of business corporations, including a railroad, a public utility, and two factories. The results are shown in Table IV.

"The purposes for which people borrow reveal dramatically the crises which come into their lives and the need of the average worker for some source of credit at such times. The most common reason for borrowing is to meet expenses incurred during illness. . . . ."[17]

[17] Both the chart and the quotation are from "Why Workers Borrow: A Study of Four Thousand Credit Union Loans," *Monthly Labor Review*, July, 1927, pp. 6–16.

The following incident very clearly illustrates a provident if not a productive use of loan funds (from the Farm Credit Administration bulletin, *Coöperative Savings with Federal Credit Unions*, February, 1935): "The president of the F.C.A. Credit Union of Houston relates that a clerk, who may be called John, saved $50 while repaying a loan of $100. He did this by making regular payments on credit union shares simultaneous with making loan repayments. The loan was repaid in 9⅓ months, at a total interest cost of $4.83. If dividends at 6 per cent were to be declared, John would receive $1.03 on his shares, making a possible net cost of $3.80 for borrowing the money."

John, a young man of fine character who had worked in a clerical position for several years, was getting a salary of about $125 a month when he married a year ago. He and his bride carefully worked out a budget adjusted to his income. Soon unexpected expenses arose which he was unable to meet.

A credit union was operating among the employees where John worked, and one of his friends in whom he confided suggested that he talk with one of the directors about helping him with his difficulties. He found that by getting one of his co-workers to sign his note, he could borrow $100 from the credit union and repay the loan over a period of nine and one-third months, and he agreed to save a small amount in the credit union with each payment on his loan. The credit committee of the credit union permitted John to fix his own terms of repayment and saving.

The following summary of John's account tells a story in itself, particularly as to

The rates charged by credit unions on loans made to their members are relatively low, usually 1 per cent per month on the unpaid balance. It may be more accurate to say that this is the

TABLE IV

PURPOSES FOR WHICH LOANS WERE GRANTED

Purpose	Number	Per Cent
Medical	929	23.2
Coal	618	15.5
Family expenses	451	11.3
Clothing	341	8.5
Investment	323	8.1
Various bills	322	8.1
House repairs and payments	302	7.6
Taxes	208	5.2
Furniture	90	2.3
Renewals	61	1.5
Education	59	1.5
Insurance	57	1.4
Vacation	57	1.4
Automobiles	39	1.0
Miscellaneous	135	3.4
No data	8	.2
	4,000	100.0

most usual "maximum rate," for a large number of the unions do not charge as much as their charters allow. It has been estimated by the Credit Union Bureau that the average charge is

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how easy it was to save in small amounts by purchasing a share each month, and how the interest on his loan decreased each month:

Payment Dates	Shares (Savings)		Loans		
	Received	Balance	Repaid	Balance	Interest
March 20	$2.50	$ 2.50			
March 21, received loan of $100.00				$100.00	
March 31	2.50	5.00	$10.00	90.00	$0.33
April 30	5.00	10.00	10.00	80.00	.90
May 31	5.00	15.00	10.00	70.00	.80
June 30	5.00	20.00	10.00	60.00	.70
July 31	5.00	25.00	10.00	50.00	.60
August 31	5.00	30.00	10.00	40.00	.50
October 1	5.00	35.00	10.00	30.00	.40
October 31	5.00	40.00	10.00	20.00	.30
November 30	5.00	45.00	10.00	10.00	.20
December 31	5.00	50.00	10.00	00.00	.10
				Total interest paid	$4.83

less than 1 per cent per month. One thousand and ten credit unions operating during 1933 charged rates as shown in Table V.[18]

Small loan laws of most states allow a maximum charge of $3\frac{1}{2}$ per cent per month. Compared with the rates made by other personal finance companies and the rates on instalment purchases, the rates charged by credit unions are exceptionally low.[19] Mr.

TABLE V

RATES CHARGED BY CREDIT UNIONS

On a Monthly Basis	Number of Societies	On a Yearly Basis	Number of Societies
½ of 1 per cent	2	4 per cent	2
⅔ of 1 per cent	2	5 per cent	14
¾ of 1 per cent	8	6 per cent	223
⅞ of 1 per cent	1	7 per cent	27
⅞ of 1 per cent	2	8 per cent	60
1 per cent	478	9 per cent	5
		10 per cent	11
		12 per cent	146
		Rates vary according to type of loan	29
			1,010

Rates of more than 1 per cent are carried to the nearest whole per cent.

Evans Clark has summarized the charges for small loans made by the various agencies in the field as shown in Table VI.[20]

The profits of credit unions are returned to the share holders in proportion to the number of shares which they hold, after a portion of earnings has been paid into the "guaranty fund." The borrower, therefore, who pays interest on his loan to the credit union usually receives at the same time some dividends on the shares which he holds. The Credit Union Bureau estimates the dividend rate prior to 1930 as approximately 7 per cent. Scattered

[18] *Monthly Labor Review*, September, 1934, p. 567.

[19] For a summary of the rates on instalment purchases see "The Cost of Installment Buying" by Lewis A. Froman, *Harvard Business Review*, January, 1933. One example shows an 86.6 per cent rate.

[20] Evans Clark, *Financing the Consumer* (1930), p. 119. These percentages were derived five or six years ago. It may be that the charges are somewhat lower now.

information covering more recent years indicates a lower rate of return, but still in most cases above 5 per cent.

Nearly one thousand credit unions reported their condensed

TABLE VI

INTEREST RATES CHARGED BY SMALL-LOAN AGENCIES

Agency	Usual Charges (Per Cent)
Credit unions	12.0
Personal loan departments	18.1
Industrial banks	17.3
Remedial loan societies	26.9
Axias	28.5
Pawnbrokers	36.0
Personal finance companies	42.0

TABLE VII

CONSOLIDATED BALANCE SHEET, 981 CREDIT UNIONS

Item	Amount		
	Total	Average	Per Cent of Total
Assets:			
Loans outstanding	$14,485,800	$14,766	75.3
Other	4,752,100	4,844	24.7
Total	$19,237,900	$19,610	100.0
Liabilities and capital:			
Share capital	13,435,500	13,696	69.9
Deposits	3,036,200	3,095	15.8
Notes payable	180,900	184	0.9
Other	2,585,300	2,635	13.4
Total	$19,237,900	$19,610	100.0

balance sheets to the Farm Credit Administration as of the end of the month in 1934 when the amount of loans outstanding was largest. This summary is given in Table VII.[21]

[21] *Credit Union Survey*, Farm Credit Administration, March 15, 1935.

From Table VII it will be noticed that loans outstanding make up approximately three-quarters of the total assets of credit societies. On the liability side, share capital constitutes an amount almost equal to outstanding loans. Deposits make up only 16 per cent of the total liabilities, and notes payable are less than 1 per cent. It is clear, therefore, that credit unions depend almost entirely upon funds raised through the sale of shares to members and through deposits made by members for the loans which are granted.

During 1934, only 14 of the 1,080 credit unions reporting on the question of borrowing during the year stated that they had attempted to borrow, but loans to them were refused. One hundred eighty-two did borrow during 1934 and 86 per cent of the 821 credit unions replying reported that loans could be obtained in 1935 if needed.[22] Three hundred and seventeen of the 1,080 credit unions reporting on operations during 1934 stated that it was necessary to postpone the approval of loan applications during the year because funds were not available for lending at the time the applications were submitted. On the average, applications were postponed about twenty-five days. One hundred and six unions refused to accept applications at times during 1934 because loan funds were not available. Even in these cases, however, the amount of applications not accepted amounted to only 1 per cent of the loans made during the year by those unions refusing to accept applications at any time during 1934. Some credit unions attempt to encourage deposits by paying relatively high rates of interest. Of the 402 societies reporting on this point in 1933, 144 of them, or 35 per cent, paid 4 per cent interest on deposits. Seventy of them paid 5 per cent, while 64 of them paid only 3 per cent. Fifty-nine of the 402 societies, however, paid 6 per cent.[23]

[22] *Ibid.* Credit unions borrow principally from commercial banks.

[23] *Monthly Labor Review*, September, 1934, p. 569.

[*Continued*]

BANK FAILURES—CAUSES AND REMEDIES

R. G. THOMAS[1]

TO AVOID failure, banks must be solvent and possess a sufficient amount of liquid assets to meet demands of depositors. It is possible for a bank to fail with ultimately sound but unliquid assets. More commonly, however, failed banks have suffered such losses as to render them insolvent. The problem of the causes of bank failure resolves itself mainly into the question of the reason for bank insolvency. Some of the evidence bearing on the subject of the cause of bank failure is presented here.

CAUSES OF NATIONAL BANK FAILURES

Any attempt to analyze the causes of national bank failures is certain to prove disappointing. The *Annual Reports of the Comptroller* furnish a complete list of national banks placed in the hands of receivers with the most important causes of the failure of each.[2] Unfortunately such causes often include such meaningless phrases as "due to depreciation of securities" and "inability to collect loans." By classifying the causes of failure into three major groups, however, it is possible to gain some understanding of the national bank failure situation. Table I gives such a classification.

When interpreting the data in Table I, one must bear in mind the large sources of error which exist. The basic information upon which the comptroller depends is derived from the reports of individual receivers of the failed banks. Further, the classification of causes varies somewhat with the individual comptroller. Considerable confusion and unreliability thus result in the final classification as given in the comptroller's reports. This makes necessary an arbitrary allocation of causes which at best gives results that are mere approximations.

[1] Associate professor of Economics, Purdue University.

[2] Causes of failure are not given for banks failing after October 31, 1931.

Certain significant conclusions may be reached, however, in spite of the unsatisfactory nature of the data. After 1872 it appears that the most frequently occurring causes of failure during periods free from acute or prolonged depression are wholly or partially found in dishonest and illegal banking practices (Group 2). During periods of serious depression such causes become rela-

TABLE I

CAUSES OF FAILURE OF NATIONAL BANKS†

Ratio of number of occurrences of each cause to the total occurrences of all causes (in approximate percentages).

Years	Poor Management (1)	Fraud and Violation of Law (2)	All Internal Causes (1) and (2)	Depression and Depreciation of Assets
1865–1872	47	32	79	20
1873–1879*	26	23	49	50
1880–1889	21	41	62	37
1890–1900*	31	29	60	38
1901–1905	21	48	69	30
1906–1908	25	48	73	26
1909–1913	20	55	75	25
1914–1920	25	63	88	12
1921–1922*	23	18	41	58
1923–1929‡				
West of Mississippi River*	31	9	40	60
East of Mississippi River, mainly in agricultural South	32	26	58	41
1930–1931*	51	1	52	47

* The starred periods contain years of severe depression. These periods show a sharp decline in fraud and illegal practices as causes of failure.

† Computed from data given in the *Annual Reports of the Comptroller of the Currency*. The data apply to all national banks placed in the hands of a receiver.

‡ Beginning 1925 the comptroller's reports classify causes of failures only as (1) incompetent management, (2) fraud, and (3) depression. This results in a reduction of the size of Group 2 by putting violation of banking laws, excessive loans, etc., into the category of poor management.

tively less important. The unusually low figures for the causes appearing in Group 2 after 1923 are partially due to a change in classification which excludes violation of banking laws. The importance of fraud and violation of banking laws as causes of bank failures is especially clear between 1890 and 1922. It is quite natural to find depression in business and depreciation of assets, for reasons other than fraud and violation of banking laws, relatively unimportant during years of prosperity.

If one combines poor management with fraud and violation of banking laws into one general class of "internal causes" and contrasts the magnitude of the "internal causes" of failure with that of the "external causes" consisting of depreciation of assets and depression, it becomes clear that the "internal causes" are the predominant ones in all save the depression periods. One may conclude, therefore, that a prevention of the operation of these "internal causes" consisting of incompetent management, fraud, and violation of established banking law would go far in abolishing bank failure even in bad times.

On the other hand, during the periods of the greatest number of failures, namely periods of acute or prolonged depression, external causes become relatively important. This was particularly true of the failures in the area west of the Mississippi River. There much distress was caused, between 1923 and 1929 by the extended depression in agriculture, following the era of land speculation.

CAUSES OF FAILURES OF INDIANA STATE BANKS 1925–31

Further light on the question of causes of bank failures is furnished by the experience of the state banks in Indiana. The major causes of failure among these banks for the years 1925–31 were:[3]

Internal causes.....	63.12 per cent of total causes assigned
Inadequate State supervision and control.....	8.24 per cent of total causes assigned
External causes.....	28.64 per cent of total causes assigned

Here again the "external causes" are relatively unimportant in comparison with "internal causes."

In respect to the classifications of "internal causes" the Commission's report concludes that "if the more rudimentary and elementary types of improper operation had been avoided, there would have been few failures. Banks did not fail by reason of a lack of ability to execute high and intricate financial projects; they failed because they made obvious mistakes, the dangers of

[3] *Report of the Study Commission for Indiana Financial Institutions* (Indianapolis, 1932), p. 74.

which are well known and easily recognized by the ordinary successful bank executive. Moreover, ... in eighteen instances failure was caused by dishonesty on the part of officials. Clearly, therefore, the public might in large measure escape the effect of these mistakes by vigorous state supervision, enforcing adequate regulatory statutes."[4]

THE CAUSES OF BANK FAILURES IN CHICAGO BEFORE 1925

During the depression period of 1873–78 ten national banks and thirteen state banks closed in the city of Chicago. The causes of the failure of the national banks were mainly injudicious banking and depreciation of securities. In only one case was failure due to fraudulent management. The state bank failures arose from excessive competition among the too numerous banks. New banks were chartered freely by the state legislature during the preceding years of prosperity. Public supervision was entirely absent. The resulting plethora of banks caused a race to attract deposits. Six per cent interest was the common rate offered for savings. To find profitable outlet for funds procured at such cost during a time of business depression banks made speculative loans on real estate. When seven of the largest savings banks failed between August 29 and December 31, 1877, it was found that over 45 per cent of their combined assets was invested in real estate or real estate loans. In addition the banks had lent large amounts at high rates of interest on worthless collateral to individuals speculating in land and construction enterprises. Three of the thirteen failing state banks had actual paid-in capital of less than 50 per cent of the supposed amount. In the case of two banks dishonest management contributed to the failure.[5]

No other failures occurred until 1890. Between that time and 1925 thirty-four incorporated banks failed.[6] None of these failures can be said to be the direct result of business and financial

[4] *Ibid.*, pp. 75, 76.

[5] *Chicago Daily Tribune*, September 16, 25, 1877; October 20, 30, 1877; December 8, 1877.

[6] The evidence summarized here was gathered by the writer from newspaper accounts and official reports too numerous to cite in this limited space.

depression. Twenty-one failed largely or in part because of excessive loans to enterprises in which their officers were interested or because of direct loans to officers for speculative purposes. Embezzlement or fraud was involved in the case of seven. The capital of six of the banks had not been fully paid at the time of organization. In only four cases does the blame appear to rest on inefficient management and weak loans arising therefrom.

The Chicago experience supports the opinion expressed in the *Report of the Study Commission for Indiana Financial Institutions* to the effect that the most frequent causes of bank failure, even in depression years, are to be found in faulty management and lax control, and that care in chartering new banks and intelligent competent supervision will go far in correcting the evil of bank failures.

The foregoing analysis of the general causes of bank failures suggests the desirability of an attempt to examine particular characteristics of failing banks. If by so doing one can discover situations and practices which appear to contribute to the more general causes already outlined, the efforts will not be entirely in vain. Corrective measures, both legislative and administrative, require a recognition of the underlying causes for fraudulent, weak and inefficient management of banks and the susceptibility of banks to severe depressions. To what extent can bank failures be related to size, type of charter, form of organization, or particular practices?

THE RELATION OF SIZE TO FAILURE

A casual examination of data on the size of failing banks gives the impression that small banks are more susceptible to failure than the large. This impression arises not only from the fact that the failures of small banks in absolute numbers far exceed those of large banks but also that the rate of failure is greater among the small banks.

Since data of both failed and non-failing national banks are readily available in the *Annual Reports of the Comptroller of the Currency* it is possible to compare the failure rates for banks of different size. Table II contains such a comparison. Banks are

classified according to the amount of capital stock since the reports of the comptroller furnish data based upon such a classification. The failure rate is computed for each class of banks by using the average of the number of banks in operation at the beginning of each year for the period under consideration. The percentage of the total number of failed banks to the average number of banks in operation is then computed. This gives a

TABLE II

NATIONAL BANK FAILURES CLASSIFIED ACCORDING TO CAPITAL STOCK*

Period	Capital of Less than $200,000			Capital of $200,000 to $999,000			Capital of $1,000,000 and Over		
	Total Number of Banks †	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)
1925 to 1929	6491	424	6.6	1155	29	2.5	234	1	.42
January 1, 1930 to October 31, 1933	5414	985	18.2	1081	171	15.8	213	21	10.0

* Compiled from the *Annual Report of the Comptroller of the Currency*, for the years 1925–33. Mr. Charles M. Cooley, graduate student at Purdue University assisted in the preparation of this and subsequent tables appearing in this study.

† Total number of banks determined by taking the arithmetical average of the number of banks in operation at the beginning of each year of the two periods.

somewhat more accurate picture of the rate of failure than a comparison of failures with the number of banks operating at the beginning of the computation period.

The rate of failure has been computed for the period 1925–29 and the period January 1, 1930–October 31, 1933. Since the failures before 1930 were mainly in the agricultural districts of the Middle West and West, one would naturally expect the failure rate to be greatest among the small banks regardless of the question of the relative advantage of size.

Beginning with 1930 the depression became more general. The failure rate of banks during the second period ought to give a

more reliable picture of the power of banks of different sizes to resist failure in the face of depression.

An examination of Table II reveals that on the average for the whole country the banks of larger sizes fared better than the smaller not only before 1930 when depression was mainly confined to agriculture but during the 1930–33 period as well.

The rates of failure for banks of different size, however, are somewhat distorted by the fact that after 1929 the agricultural areas, which contained over two-thirds of the banks with capital of less than $200,000, were subjected to continued severe depression—more acute in fact than that suffered in the larger cities. A more accurate picture of the relation of size to failure may be had by computing the failure rate of banks of different size for each general geographical area. The results of such a computation for the period 1930–33 are given in Table III.

The rates of failure shown in Table III exhibit remarkable variety. Among the national banks of New England the failure rate grows steadily worse as banks grow in size. Among banks of the East those in the group next to the smallest in size fared the best. Otherwise there is little difference. In the Pacific area the second from the largest group, showed no failures while the other three groups show little difference. The three great agricultural areas of the South, the Middle West, and the West show a marked difference between the failure rates for banks with capital of $1,000,000 and over and the smaller banks. Here is the reason for the favorable showing of the group of largest banks in the country wide averages of Table II.

The banks with capital of over $1,000,000 in the three agricultural areas consisted of the larger banks of the largest cities of those areas. Although dependent for their prosperity upon trade with the surrounding agricultural regions, these centers were essentially industrial and commercial in their nature. The type of banking business available to such banks was not unlike that of the banks of similar size in the more highly industrialized areas. In fact, the failure rate for these banks in the South and Middle West is approximately the same as that for New England and the East. The especially good record of the large banks in the

TABLE III

FAILURES OF NATIONAL BANKS IN DIFFERENT AREAS CLASSIFIED ACCORDING TO CAPITAL STOCK, 1930–33

CAPITALIZATION GROUP	NEW ENGLAND			EAST			SOUTH			MIDDLE WEST			WEST			PACIFIC		
	Total Number of Banks*	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)
Less than $200,000.....	242.5*	5	2.1	1287	157	12.2	1158.0	230	19.9	1402.0	378	27.0	969.0	170	17.5	350.7	56	16.0
$200,000 to $499,000...	79.7	3	3.8	290	20	6.9	154.0	38	24.7	201.5	58	28.8	63.7	4	6.3	50.7	8	15.8
$500,000 to $999,000...	23.0	1	4.3	79	9	11.4	44.7	16	35.8	63.2	15	23.7	9.5	1	10.5	20.5	0	0.0
$1,000,000 and over....	18.5	2	10.8	55.5	6	10.8	54.5	5	9.2	43.2	5	11.6	14.2	0	0.0	18.2	3	16.5

* Total number of banks is the average of the number operating at the beginning of each year 1930–33.

West is the only exception. One is forced to the conclusion that among the national banks size has been a relatively unimportant factor in relation to the rate of failure.[7] Even where the largest banks show some superiority that superiority is due to the fact that they are being compared to small banks which were more ex-

TABLE IV

INDIANA BANK FAILURES 1925–31*

(Classified by size of capital stock)

Capital Stock	Failures in Each Group in Percentage of Average Number of Active Banks in Each Group
$ 10,000–$ 19,999	19
20,000– 29,999	26
30,000– 39,999	18
40,000– 49,999	22
50,000– 59,999	30
60,000– 69,999	33
70,000– 79,999	33
80,000– 89,999	50
90,000– 100,000	0
100,000– 199,999	18
200,000– 299,999	15
300,000– 399,999	28
400,000– 499,999	18
500,000–and over	12
Average for all groups	24

* *Report of Study Commission for Indiana Financial Institutions*, p. 56.

posed to the blows of depression. It is interesting to note that in a number of instances larger banks show a distinctly less favorable failure rate than the smaller.

Additional evidence bearing on the relation of size to rate of failure is given in Table IV. Among Indiana banks of capitalization of less than $100,000 the smaller banks were frequently superior to the larger.

[7] Ralph R. Pickett reached a similar conclusion in respect to the relation of size to failure. "The Size of Failed National Banks," *Journal of Business*, January, 1934.

FAILURE RATE OF NATIONAL AND OTHER THAN NATIONAL BANKS

The failure experience of national banks has been vastly better than that of the state and private banks. Likewise Federal Reserve member banks have made a better showing than have the non-member banks. The superiority of member banks over the non-members can be ascribed to the character of the banks which are members rather than to the fact of membership itself. This is indicated by the fact that the bulk of the Federal Reserve

TABLE V

SUSPENSION RATE OF DIFFERENT CLASSES OF BANKS EXPRESSED IN PERCENTAGE OF FAILURES TO TOTAL BANKS IN EACH CLASS*
(As of December 31 of the preceding year)

Year	National	State and Private	State Member	All Members	Non-Member
1926	1.5	4.1	2.4	1.6	4.2
1927	1.1	2.9	2.4	1.3	2.9
1928	.7	2.3	1.2	.8	2.4
1929	.8	3.2	1.4	.9	3.3
1930	2.1	6.8	2.3	2.1	7.1
1931	5.8	12.0	10.6	6.4	12.1
1932	4.3	8.6	6.2	4.5	8.6

* Compiled from data appearing in the *Federal Reserve Bulletin*, for the years 1930–33.

membership is made up of national banks and the state banks located in the larger financial centers, both of which have relatively low failure rates. The suspension rates of the different types of banks during the period 1926–1932 are presented in Table V.

To eliminate the possibility of distortion of the failure rate because of the nature of the geographical distribution of the different types of banks, a comparison is made, in Table VI, for each geographical area.

In each of the geographical areas for each of the four periods the failure experience of the national banks was better than that of the state banks. In many instances it was distinctly better. A more comprehensible view of this is presented in Table VII in which the rate of failure is computed for the period June, 1929—March 15, 1933.

TABLE VI

Comparison of National Bank Failures with Other Bank Failures by Geographical Distribution*

(Total banks given as the number operating at the beginning of each period.)

Period—Year Ending	Type of Bank	New England			Eastern			Southern			Middle West			West			Pacific		
		Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Total Number of Banks	Number of Failures	Rate of Failure (Per Cent)
June 30, 1930	National	384	1	.24	1833	2	.11	1648	36	2.2	1995	22	1.1	1173	18	1.5	497	3	.60
	Other Banks	716	3	.42	1791	10	.56	4223	173	4.1	7291	220	3.0	2849	145	5.1	860	7	.70
June 30, 1931	National	377	0	.00	1803	31	1.7	1556	85	5.5	1890	83	4.4	1135	24	2.1	486	6	1.2
	Other Banks	715	10	1.4	1747	47	2.7	3944	485	12.3	6910	559	8.1	2618	192	7.3	831	31	3.7
June 30, 1932	National	366	8	2.2	1744	84	4.8	1421	110	7.7	1738	155	8.9	1074	63	5.9	457	38	8.3
	Other Banks	696	34	4.9	1651	160	9.2	3488	411	11.8	6245	943	15.1	2350	312	13.3	777	111	14.3
July 1, 1932 to March 15, 1933	National	350	0	.00	1623	22	1.4	1265	28	2.2	1526	67	4.4	983	32	3.3	398	24	6.0
	Other Banks	644	1	.15	1399	25	1.8	3061	144	4.7	5214	493	9.5	2010	184	9.2	630	75	11.9

* Compiled from data appearing in the *Annual Report of the Comptroller of the Currency*, 1929-33.

TABLE VII

COMPARISON OF FAILURES OF NATIONAL BANKS WITH OTHER BANKS BY GEOGRAPHICAL DIVISIONS
JUNE 1929—MARCH 15, 1933

(Total number of banks is the average of the number at the beginning of each yearly period starting June 30.)

Type of Bank	New England			East			South			Middle West			West			Pacific		
	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)	Average Number of Banks	Number of Failures	Rate of Failure (Per Cent)
National	369	9	2.4	1751	127	7.2	1472	238	16.2	1787	287	16.0	1091	119	10.9	459	53	11.5
Other banks	693	47	6.8	1647	230	13.9	3679	1136	30.8	6415	1924	30.0	2457	727	29.6	774	184	23.7

Although state bank failure rates were worse in all areas than those of the national banks, they were especially unfavorable in New England, the West, and the Pacific areas.

The state bank record may be blamed upon two main causes. First, state bank charters have been too easily obtained by irresponsible and inexperienced individuals. Further they have been issued with little regard to the actual banking needs of the community to be served. For example, in numerous instances Indiana villages of less than five hundred inhabitants boasted two or more banks.[8] The second cause is lax supervision of banks evident in many states because of inadequate banking laws, and underpaid, over-worked, and inefficient examiners.

The record of state and national bank failures shows a crying need for a unified banking system operating under federal control. This would facilitate the prevention of overbanking resulting from lax and competitive chartering while bringing uniformity of regulation and control. The present make-shift arrangement arising from the Federal Deposit Insurance Corporation activities cannot go to the root of the problem.

BRANCH BANKING

It would be desirable to compare the failure experience of branch banks with that of unit banks operating under similar conditions. Unfortunately adequate data seem not to be available. However, on December 31, 1929, there were 822 branch banking systems with 3,547 branches reported as operating in the United States.[9] During 1930 and 1931, 134 branch systems failed with 388 branches.[10] Altogether 134 branch systems out of a total of 822 operating at the beginning of the period failed during these two years, with a failure rate of 16.3 per cent. Putting it in another way, 522 out of a total of 4,369 banking offices operating under branch systems failed with a failure rate

[8] *Report of the Study Commission for Indiana Financial Institutions*, p. 88.

[9] *Hearings of the Committee of Banking and Currency of the House of Representatives on Branch, Chain, and Group Banking* (1930), p. 459.

[10] H. Parker Willis and John M. Chapman, *The Banking Situation*, p. 310, quoting from the unpublished report of the Federal Reserve Committee on branch, group, and chain banking.

of 11.9 per cent. This may be compared with the failure rate for all national banks for the two years of 7.9 per cent and for all state and private banks a failure rate of 18.8 per cent. This scanty evidence leads one to suspect that branch banking as practiced in the United States is on the average inferior to the unit national banking system and is about on the general level of the state banks. One may add that this is not a fair test of the efficiency of genuine branch banking. Of the 388 branches involved in failures only 113 were located outside of the home city of the parent bank while none was able to obtain the advantages of diversification which might arise out of interstate branch banking.

STOCKHOLDERS' EQUITY IN BANKS AS RELATED TO FAILURE

It is natural to suspect that one contributing factor in bank failures is insufficient stockholders' equity. Table VIII contains a comparison of the ratio of stockholders' equity to deposits between national banks which failed during the first ten months of 1932 and all national banks. The comparison is as of December 1, 1930, which is sufficiently far ahead of the date of the failures involved to give a fair picture.

The evidence is not at all conclusive that the failed banks one year or more before failure had a stockholders' equity ratio inferior to that of the average bank. The difference in the two groups of smaller banks is so slight as to be of little significance while the equity ratio of the group of largest banks was actually greater for the failed banks than for all banks. It may be argued that the banks which afterward failed had lost deposits thus improving the appearance of their stockholders' equity. This would be more convincing, however, if the ratios had been computed as of the date of failure. As it stands the ratio of invested capital to deposits both for all banks and for those doomed to failure was considerably better than the 1:10 figure often suggested as a minimum.[11]

This of course does not mean that a satisfactory ratio of invested capital is not a necessary feature of sound banking. It does

[11] For similar results among Chicago banks see Table X.

indicate, however, that it will not overcome the effects of bad management. It might be observed, in this connection, that the conventional methods of insuring adequate bank capital are decidedly faulty. The minimum legal capital requirements for national banks, for example, are not over $200,000 regardless of the size of the banks or the volume of deposit liabilities. On the other hand the present relatively large requirement of $50,000 for starting a national bank in the smallest towns may, under competitive chartering that has existed, result actually in a quantity

TABLE VIII

RATIO OF STOCKHOLDERS' EQUITY TO DEPOSITS FOR NATIONAL BANKS WHICH FAILED JANUARY 1—OCTOBER 31, 1932, AND FOR ALL NATIONAL BANKS*

(As of December 1, 1930)

Size of Banks Classified According to Capital Stock	Number of Failed Banks	Stockholders' Equity to Deposits—Failed Banks (Per Cent)	Stockholders' Equity to Deposits—All Banks (Per Cent)
Under $200,000.....	183	15.7	17.5
$200,000–$999,000...	52	14.6	16.9
$1,000,000 and over..	4	16.3	16.1

* Compiled from the *Annual Reports of the Comptroller of the Currency.*

of banking capital in some communities in excess of the banking needs. When this occurs, unfortunate competitive practices to obtain business may result in the downfall of the whole banking structure in that locality.

It is evident to anyone familiar with the history of bank failures that the invested capital of a bank indicated in the published statement may be partially fictitious. This may arise from losses which have not been charged off and from failure of the original subscribers of stock to actually pay in the required capital. Stockholders have sometimes paid for their subscriptions with their promissory notes thus giving the bank little if any cash capital. An occasional practice of chain banking involves borrowing by stockholders from an existing bank to get the capital funds of a new member of the chain. The effect of such

practices upon the safety of the banks is obvious. In Chicago such "pyramiding" of bank capital has occurred in the case of two large chains which subsequently failed.

CHARACTERISTICS OF FAILED OUTLYING STATE BANKS IN CHICAGO

During the year 1931 fifty state banks failed in Chicago outside of the Loop district. Because 1931 was the first year of serious banking trouble in that city during the current depression one may conclude that these fifty failing banks were the weakest of the lot. Out of all the outlying state banks operating in 1929, twenty-four were listed as in operation July 1, 1934.[12] These may properly be considered the strongest of the outlying state banks.

The failed and surviving banks have been classified according to size and data selected from the statements of condition as of June 29, 1929, given in the official published reports. The data and the ratios computed therefrom appear in Tables IX and X.

Table X enables one to compare the condition and some of the practices of the failed and the surviving banks during the prosperous half of 1929. The grouping according to size aids in preventing distortion of the results as a whole by the larger banks.

One evidence of weakness in management appears to lie in the relative size of real estate loans. The proportion of loans on real estate to total loans was greater for the failed banks than for the surviving banks in all four groups. Likewise the proportion of such loans to time deposits was greater for the failed than for the surviving banks. One might conclude, therefore, that real estate loans are dangerous for banks doing a mixed commercial and savings business. But this conclusion is hardly warranted in view of the rather substantial size of real estate loans of the surviving banks. Such differences as are indicated in Table X are not sufficient for drawing any sweeping conclusions regarding the desirability of real estate loans. On the average, the failed banks kept their real estate loans below 50 per cent of their time deposits. Perhaps, indirectly, these findings indicate that banks which en-

[12] Three of these were reorganized during the depression. The fact that they were considered worth reorganizing indicates their relative strength in spite of difficulties.

ter the field of real estate lending with greater enthusiasm and energy are in greater danger of making unwise loans on real estate than those which adopt a more conservative policy of diversification.

It is impossible from the published reports to classify bank assets in such a way as to discover the amount of secondary re-

TABLE IX

SELECTED DATA ON OUTLYING CHICAGO BANKS CLASSIFIED ACCORDING TO TOTAL RESOURCES*

(As of June 29, 1929)

ITEMS OF SELECTED DATA (Data given in thousands of dollars)	GROUP 1 RESOURCES UNDER $2,000,000		GROUP 2 RESOURCES $2,000,000 TO $4,999,000		GROUP 3 RESOURCES $5,000,000 TO $9,999,000		GROUP 4 RESOURCES $10,000,000 AND OVER	
	Solvent in 1934 (9 Banks)	Failed during 1931 (20 Banks)	Solvent in 1934 (4 Banks)	Failed during 1931 (19 Banks)	Solvent in 1934 (5 Banks)	Failed during 1931 (8 Banks)	Solvent in 1934 (6 Banks)	Failed during 1931 (3 Banks)
Real estate loans	2,298	6,088	2,531	11,183	6,107	10,315	11,504	10,563
Total loans	6,899	14,142	9,020	34,590	26,249	34,731	46,662	28,497
Cash and due from banks	1,972	2,863	1,533	7,757	4,305	5,809	9,221	6,171
United States bonds	269	497	604	1,920	2,527	2,728	5,969	1,989
Other bonds	3,773	6,485	3,779	15,220	6,493	9,808	10,406	6,700
Fixed assets, including other real estate	397	1,545	94	2,010	1,653	2,270	1,775	1,469
Total resources	13,338	26,052	15,266	62,172	41,520	55,647	74,751	45,794
Time deposits	6,095	12,775	8,524	32,298	24,699	24,499	32,060	25,247
Total deposits	10,766	20,278	13,035	52,294	35,426	46,515	62,661	38,286
Capital stock	1,600	3,625	900	4,800	2,650	4,350	4,150	3,250
Surplus and undivided profits	701	1,262	930	2,839	2,623	2,532	4,679	2,088
Total invested capital	2,301	4,887	1,839	7,639	5,273	6,882	8,829	5,338

* Compiled from the *Statement of State Banks of Illinois*, June 29, 1929.

serves. However, the volume of cash (including due from banks) and United States bonds indicates something of the liquid position of these banks. There is, of course, no way in which to allow for window dressing at the time of the mid-year called reports. Taking the published reports at their face value one finds no very significant difference between the cash position of the failed and the surviving banks.

A somewhat more significant difference between the failed and the surviving banks appears in the ratio of fixed assets to invested capital. In Group I the proportion of capital tied up in buildings, fixtures, and real estate was nearly twice as great for the failed as for the surviving banks. The difference is much greater in Group II although in Groups III and IV it is less. The banks which survived were on the whole more conservative in respect

TABLE X

RATIOS BASED ON SELECTED DATA ON OUTLYING CHICAGO BANKS
(As of June 29, 1929)

RATIOS (In form of percentages)	GROUP 1 RESOURCES UNDER $2,000,000		GROUP 2 RESOURCES $2,000,000 TO $4,999,000		GROUP 3 RESOURCES $5,000,000 TO $9,999,000		GROUP 4 RESOURCES $10,000,000 AND OVER	
	Solvent in 1934 (9 Banks)	Failed during 1931 (20 Banks)	Solvent in 1934 (4 Banks)	Failed during 1931 (19 Banks)	Solvent in 1934 (5 Banks)	Failed during 1931 (8 Banks)	Solvent in 1934 (6 Banks)	Failed during 1931 (3 Banks)
Real estate loans to total loans	33.0	43.0	28.0	34.2	23.2	30.0	24.7	37.1
Real estate loans to time deposits	37.4	47.6	29.7	36.7	24.7	35.0	35.9	41.8
Cash and U.S. bonds to total deposits	20.8	16.5	16.4	18.5	19.3	18.4	24.2	21.3
Fixed assets to invested capital	16.2	31.6	5.1	26.3	31.3	33.0	20.1	27.5
Total loans to total deposits	64.0	69.0	69.1	66.2	73.9	74.6	74.3	74.4
Invested capital to total deposits	21.4	24.0	14.1	14.6	14.9	14.8	14.2	13.9
Surplus and profits to capital stock	43.8	34.8	51.1	37.2	50.0	36.8	53.1	39.1

to investment in fixed assets. This is accounted for by less pretentious buildings, by more conservative valuation and by heavy writing-off of the value of real estate during years of good earnings.

The ratios of total loans to total deposits were not substantially different for the failed and the surviving banks. Rediscounting and borrowing was not large in any case, while the proportion of funds invested in securities and loans was about the same.

The ratio of invested capital to deposits of the failed banks compares very favorably with that for the surviving banks. Against this apparent equality it should be kept in mind that in the case of some of the failed banks subsequent developments revealed that the capital stock was bought with funds borrowed at other affiliated banks. However, on the whole it is probable that the ratio of real invested capital to deposits for the failed banks compared well with that of the surviving banks. On the other hand, the surviving banks had accumulated a larger volume of surplus and undivided profits than had the failing banks. The smaller accumulations of surplus and undivided profits of the failed as compared with the surviving banks need not be blamed upon a policy of attempting to operate on an unduly thin equity. The ratio of invested capital to deposits belies such a conclusion. Rather, it would seem to have arisen from a failure to attract enough business to make additional invested capital necessary. In fact approximately one-half of the failed banks as compared with one-fourth of the surviving banks were incorporated after 1920. The relative newness of the failed banks would therefore account for the relative size of surplus and profits.

The banks which failed during 1931 were to a large extent the product of the prosperous years in Chicago after 1920. Frequently they were organized as a result of and to participate in the real estate boom of the times. New and rapidly growing residential areas furnished both the deposits and the demand for speculative real estate loans which were sources of weakness for many which failed. The surviving banks were more predominantly older banks, better intrenched and more conservatively managed.

The conclusions to which the above data and discussion point are mainly negative. Failure cannot be blamed on the prevalence of real estate loans in themselves, nor on lack of a good cash position as the break in prosperity neared. Nor can it be said that insufficient invested capital, in so far as the published statements are accurate, was to blame for failure. One is forced to the conclusion the causes of failure cannot be found in any deviation from particular standards regarding the volume of real estate loans, the amount of purchased securities, the liquid position or the

invested capital. Rather the secret of successful banking lies almost completely in the honesty and good faith of the management and its ability to distinguish between good and bad loans and investments. Naturally a good loan or investment is one that will be of value even in bad times. Bad times only serve to accentuate the difference between the good and the bad which prosperous times so frequently conceal.

CONCLUSION

The evidence presented here shows that faulty management rather than external circumstances is the major cause for bank failures. During prosperous times fraudulent and illegal banking practices loom large among the causes of failures. During periods of prolonged depression weak and inefficient management, unable to meet the rigorous requirements of the times, contributes heavily to failure. It follows, therefore, that the most fruitful remedies for bank failure must be sought in the direction of improved management.

There are, naturally, two general methods of approach to the problem of improving bad bank-management. The first consists of using direct pressure; the second involves altering the institutional framework within which bankers must function. One form of direct pressure might well consist of a requirement that all bank executives should demonstrate their possession of a minimum amount of knowledge of sound banking principles and practice by passing some form of examination. Such a plan might give rise to a body of "Certified Bankers" which would assist in the promotion of a professional attitude among bankers in general. In addition to such measures, there must be retained and strengthened the existing methods of examination and control by public authority. The intelligent bank examiner and supervisor can very effectively improve the quality of bank management by insistence upon sound loan and investment policies as well as by the detection of fraudulent and illegal practices.

Not only is more effective direct pressure for good management policies needed but also such changes in the institutional framework surrounding banking activities must be made as will

be conducive to better management. We are confronted with the question of what changes are desirable.

It is commonly held that small banks are much more susceptible to failure than the large and, therefore, large banking units are to be encouraged. This study, however, shows that the failure rate of large banks is quite as great as that of small banks during the last few years. An attempt to prevent failures by encouraging development of banks of larger size cannot in itself be expected to be particularly beneficial. One benefit from such an attempt might arise from the fact that the increase in the size of banks in rural areas would necessitate the introduction of branch banking. If branch systems of the type capable of promoting diversification of loans and deposits resulted it should bring a definite gain in bank stability.

Another proposed improvement in the banking system takes the form of minimum requirements for the ratio of stockholders' equity to deposit liabilities. This study indicates that such requirements would be of little consequence in preventing failures. The failed banks studied generally had a ratio of stockholders' equity to deposits as substantial as that of the surviving banks and in any event well above the commonly suggested minimum.

Although state bank failure experience was considerably worse than that of national banks, membership in the Federal Reserve System appears to be of little benefit. When one takes into account the fact that most state member banks are located in areas less exposed to depression, their superiority over non-member banks becomes unimportant in the light of their decided inferiority in comparison with national banks. Attempts to force all state banks into membership of the Federal Reserve System appear to be of little use in preventing failures.

On the other hand this study indicates that very definite gains could be realized by the abolition of the dual system of chartering banks. This is true first because the state-chartered banks have been much more susceptible to failure than the national banks and second, because the dual system has contributed to over expansion of new banks during periods of prosperity. This has in turn tended to increase the number of inexperienced and incom-

petent bankers in the field and resulted in excessive competition leading to unwise banking practices. The effectiveness of public supervision could be greatly enhanced by a unified system of commercial banks under federal control.

In both good and bad times defective bank-management has all too frequently taken the form of excessive loans to the bank's own officers. This fact suggests two possibilities for improvement. First, the prohibition against loans by banks to their executive officers, as provided in the Banking Act of 1933, should be extended to include loans to firms controlled in any substantial measure by such bank officers. This would definitely ban the doubtful practice of attempting an impartial appraisal of the banker's own credit standing and should go far in reducing the abuses of excessive and fraudulent loans to insiders.

Second, temptation to borrowing by inside interests might well be reduced. An outright prohibition of all banking affiliates would be a wholesome change. This could be done with no harm to banking efficiency if branch banking barriers were abolished. Also branch banking, in contrast to unit banking, furnishes a more adequate outlet for the energies and abilities of the capable banker and reduces somewhat the urge to develop outside business interests.

The possibilities of improvement in the management of banks seem greater under a sound branch banking system than under a unit banking system. However, the evidence indicates that branch banking as we have it in the United States has not on the average been equal to the average performance of the national banks which are predominantly of the unit form. Branch banking, to be of any serious consequences, must be allowed to develop over wider areas than those allowed at present.